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DR. J. E. SMITH'S
BOTANICAL
DICTIONARY

THIRD EDITION,

WITH

Twenty-five New Plates.

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1855.



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A

BOTANICAL DICTIONARY:

OR,

ELEMENTS

OF

SYSTEMATIC AND PHILOSOPHICAL

BOTANY.

BY COLIN MILNE, LL.D.

AUTHOR OF INSTITUTES OF BOTANY, AND HABITATIONS OF
ENGLISH PLANTS.

THE THIRD EDITION,

REVISED, CORRECTED, AND VERY CONSIDERABLY ENLARGED.

Illustrated by Twenty-five New Plates.

Πλεῖστα φέρει ζείδωρος ἄρουρα
Φάρμακα, πολλὰ μὲν ἐσθλὰ μεμιγμένα, πολλὰ δὲ λυγρά.

HOM. ODYSSEY. Δ'.

Quid majora sequar? Salices, humilesque genestæ,
Et tiliaë, pecori frondem, aut pastoribus umbras
Sufficiunt, sepemque satis, et pabula melli.

Juvat arva videre

Non rastris, hominum non ulli obnoxia curæ.
Ipsæ Caucasio steriles in vertice silvæ
Dant alios aliaë foetus: dant utile lignum
Navigis pinos, domibus cedrumque cupressos.
Hinc radios trivere rotis, hinc tympana plaustris
Agricolæ, et pandas ratibus posuere carinas.

VIRG. GEORG. Lib. II.

L O N D O N :

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1805.

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TO HIS GRACE

HUGH PERCY,

DUKE AND EARL OF NORTHUMBERLAND,

EARL PERCY, AND BARON WARKWORTH,

LORD LIEUTENANT AND VICE-ADMIRAL OF NORTHUMBERLAND AND
NEWCASTLE-UPON-TYNE, HIGH STEWARD OF LAUNCESTON, AND
CONSTABLE OF LAUNCESTON-CASTLE, ONE OF THE COUNCIL OF STATE
OF THE PRINCE OF WALES IN CORNWALL, AND KNIGHT OF THE
MOST NOBLE ORDER OF THE GARTER;

THE FOLLOWING IMPROVED EDITION OF A WORK,
WHICH ORIGINALLY APPEARED UNDER THE DISTINGUISHED AUSPICES OF
HIS ILLUSTRIOUS FATHER, THE MÆCENAS OF HIS AGE,
ON WHOSE APPROBATION OF THIS HIS FIRST ATTEMPT TO ILLUSTRATE
AND PROMOTE A SCIENCE, WHICH HIMSELF NOT ONLY PATRONIZED,
BUT EMINENTLY ADORNED, THE AUTHOR WILL EVER REFLECT WITH
PECULIAR SATISFACTION,

IS INSCRIBED,

WITH THAT PROFOUND RESPECT AND VENERATION, WHICH THE TRULY
DIGNIFIED CONDUCT

HIS GRACE HAS UNIFORMLY MAINTAINED,

BOTH IN PUBLIC AND DOMESTIC LIFE, MORE EVEN THAN

HIS ELEVATED RANK,

OR

THE SPLENDOR OF HIS ANCESTRY,

IS SO JUSTLY ENTITLED TO COMMAND,

BY HIS GRACE'S VERY FAITHFUL,

AND MOST DEVOTED

HUMBLE SERVANT,

COLIN MILNE.

PREFACE.

THIS corrected and greatly enlarged edition of his Botanical Dictionary, the Author cannot submit to the public without previously embracing an opportunity which so naturally presents itself, of expressing, in the strongest terms, his sincere acknowledgements for the very favourable reception which the work has obtained since its first publication; and in particular, for the mention so honourably made of it in the periodical, and various other writings of the Learned, both in this country and on the Continent.

Had circumstances permitted, it was fully the Author's intention, among other prefatory matter, to have offered some remarks on his Descriptions of the Natural Orders of Linnæus—a part of his subject, on which he has bestowed a more than ordinary share of attention, as the Descriptions alluded to, he must consider as peculiarly and exclusively his own*. But this he must at present decline;

* See the article FRAGMENTA METHODI NATURALIS.

PREFACE.

partly in consideration of the size which the volume has already attained, but chiefly in justice to the Publisher, who, having incurred a considerable expence in adorning it, has a right to expect that he may not be exposed to suffer by any unnecessary delay in the publication.

To his ingenious and excellent friend, Dr. THORNTON, at whose earnest and repeated request this edition was undertaken, the Author stands indebted for many useful suggestions towards the improvement of the present work, and for several valuable communications during the progress of it. With the literary character of this gentleman the world is so well acquainted, that any endeavour of the Author to add to his well-earned fame, would be superfluous. But though it be generally known that his eminence in his favourite science can only be equalled by the generous ardour he manifests in its pursuit, and the disinterested public-spirited sacrifices which for years he has been making for the advancement of its objects, it belongs to those alone who enjoy the happiness of his friendship, to remark the superior qualities of his mind and heart—that noble independence which, in matters of science, disdains the fetters of authority, and dares to think for itself—that candour, so estimable, because so rare, which, on even the shadow of merit,

PREFACE.

is eager to bestow its due portion of applause—that mild forbearance, which he never fails to exercise towards those who, envious of abilities which they despair to reach, have not the magnanimity to emulate his candour;—above all, that love of virtue (not the inseparable concomitant of learning) which pervades every page of his writings, prompting him to render every talent and pursuit subservient to the advancement of the essential interests of morality and religion. In praise of such a man, (and the portrait is neither ideal, nor drawn by the flattering hand of partial friendship) it were scarce possible to exceed; nor of his fate with the most distant posterity, requires it much prophetic sagacity to pronounce,

“*SEMPER HONOS, NOMENQUE SUUM, LAUDESQUE MANEBUNT.*”

ERRATA.

The reader is requested to correct the following *inaccuracies*. In the article ACINI, for "*strawberry*," read "*raspberry*;"—At the end of the article BRACTEATÆ, for "*and is exemplified, &c.*" read "*which is exemplified*;"—In the article CAPITATUS *flos*, at the beginning, for "*a fructification, generally consisting of many flowers*," read, "*a flower generally consisting of many fructifications*;"—In the article CORCULUM, line 5, for "*the former*," read, "*the latter*;"—and in STRUCTURA VEGETABILIS, page 3, line 23, after *liber*, for, "*from its fine and thin plates, &c.*" read, "*the leaves of books, (libri) being originally formed from its fine, thin plates.*"

* * The Binder is desired to place, immediately after the Preface, Ray's Method—Tournefort's ditto, and Linnæus's Analysis. —The Plates, Index, and Alphabetical List, conclude the work.

RAY'S METHOD.

This complex but beautiful Mode of Arrangement is founded chiefly on the Fruit, combined with the Habit or Port of Plants, and a Variety of other Circumstances. Plants, according to this Method, are primarily divided into.

										CLASSES.	EXAMPLES.
Such as bear no Buds, termed Herbs;											
{	Imperfect plants, — — — — — — — — —									1 Submarinae, — — —	Corallines, sponge, fuci.
	Perfect plants, — — — — — — — — —									2 Fungi, — — —	Mushrooms.
	rising with two seed-leaves, — — — — — — — — —									3 Musci, — — —	Mosses.
	without petals, — — — — — — — — —									4 Capillares, — — —	All the fern tribe.
	with petals, — — — — — — — — —									5 Apetalae, — — —	Hop, hemp, nettle, dock, orach, amaranthus, alchemilla, plantain, knawel, mercury.
	with a compound flower, — — — — — — — — —									6 Planipetalae, — — —	Lettuce, dandelion, hawk-weed, goat's-beard, nipple-wort, succory.
	with a simple flower, — — — — — — — — —									7 Discoideae, — — —	After, golden-rod, groundsel, colt's-foot, cudweed, leopard's-bane.
	having naked seeds, — — — — — — — — —									8 Corymbiferae, — — —	Sun-flower, marigold, fever-few, daisy, wormwood, tanfy, milfoil.
	in number one, — — — — — — — — —									9 Capitatae, — — —	Thistle, artichoke, blue-bottle, burdock, saw-wort, scabious, teasel.
	in number two, — — — — — — — — —									10 Monospermae, — — —	Valerian, thrift, agrimony, marvel of peru, fumatory.
{	in number four, — — — — — — — — —									11 Umbelliferae, — — —	Lafer-wort, shepherd's-needle, hemlock, fanicle, angelica, master-wort.
	in number many, — — — — — — — — —									12 Stellatae, — — —	Madder, goose grass, wood-roof.
	having the seeds covered, — — — — — — — — —									13 Asperifoliae, — — —	Comfrey, borage, lung-wort, bugloss, hound's-tongue, mouse-ear.
	with a pulpy substance, — — — — — — — — —									14 Verticillatae, — — —	Rosemary, mint, marjoram, sage, betony, germander.
	with a membranaceous substance, — — — — — — — — —									15 Polyspermae, — — —	Water-plantain, ranunculus, herb-bennet, adonis, anemone.
	of the apple kind, — — — — — — — — —									16 Pomiferae, — — —	Cucumber, melon, pumpkin, gourd, passion-flower.
	of the berry kind, — — — — — — — — —									17 Bacciferae, — — —	Herb-christopher, butcher's-broom, deadly night-shade, winter-cherry.
	that is manifold, — — — — — — — — —									18 Multifiliquae, — — —	House-leek, peony, hellebore, monk's-hood, columbine, fraxinella.
	that is single, — — — — — — — — —									19 Monopetalae, — — —	Hen-bane, speedwell, loose-strife, mullein, mallow, fox-glove.
	with one petal, — — — — — — — — —									20 Di-Tripetalae, — — —	Enchanter's night-shade, marsh-aloe.
{	with two and three petals, — — — — — — — — —									21 Siliquosae, — — —	Stock, fatin-flower, scurvy-grass, poppy, rue, epilobium.
	with four regular petals, — — — — — — — — —									22 Leguminosae, — — —	Pea, vetch, lentils, broom, trefoil.
	with four irregular petals, — — — — — — — — —									23 Pentapetalae, — — —	Pink, lychnis, chickweed, violet.
	with five petals, — — — — — — — — —									24 Floriferae, — — —	Hyacinth, narcissus, tulip, flower-of-a-day, fow-bread, orchis, ginger.
	with grassy leaves and one or more petals — — — — — — — — —									25 Staminae, — — —	Rush, acorus, and the grasses.
	rising with one seed-leaf, and wanting the petals, — — — — — — — — —									26 Anomaliae, — — —	Water-lily, barren-wort, meadow-rue, pine-apple, pepper, vanelloe.
	Herbs of uncertain family, — — — — — — — — —									27 Arundinaceae, — — —	The palms.
	Such as bear Buds, termed Trees;									28 Apetalae, — — —	Fir, pine, cedar, cypress, juniper, walnut, oak, chestnut, poplar.
	rising with one seed-leaf, — — — — — — — — —									29 Fructu umbilicato, — — —	Apple, quince, medlar, rose, honey-suckle, hawthorn, elder.
	rising with two seed-leaves, — — — — — — — — —									30 Fructu non umbilicato, — — —	Plum, almond, cherry, peach, orange, lemon, calabash, arbutus, olive, acajou.
{	The flower placed apart from the fruit, — — — — — — — — —									31 Fructu sicco, — — —	Maple, ash, lime, tamarisk, elm, lilac, fumach, tea.
	which is crowned with the calyx, — — — — — — — — —									32 Fructu filiquoso, — — —	St. John's bread, oleander, cassia, tamarind, acacia, broom, laburnum, bladder-fenna.
	not crowned with the calyx, — — — — — — — — —									33 Anomaliae, — — —	Fig.
	The flower joined to the fruit, — — — — — — — — —										
	of a dry skinny substance, — — — — — — — — —										
	of the pod kind, — — — — — — — — —										
	Trees of difficult arrangement. — — — — — — — — —										

Observation.—This method is much to be esteemed for its approximation to nature. The 1st, 3d, 4th, 6th, 11th, 12th, 13th, 14th, 16th, 21st, 22d, and 25th classes are true natural families.

TOURNEFORT'S METHOD.

This celebrated Method is founded upon the Figure of the Petals, in which Respect it is preferable to that of Rivinus and Knaut; Figure being more constant than Regularity or Number. According to it, Plants are primarily divided into

				CLASSES.	EXAMPLES.
Herbs and under-shrubs;	Bearing flowers,	With petals,	The flowers simple,		
				Having one petal,	
				{ that is bell-shaped,	1 <i>Campaniformes</i> , - Deadly night-shade, gentian, convolvulus, navel-wort, mal-
				{ funnel-shaped, —	2 <i>Infundibuliformes</i> , Tobacco, thorn-apple, primrose, valerian, borage, loose-
				{ of various figures,	3 <i>Anomali</i> , - - Arum, Birth-wort, toad-flax, bear's-breech, spurge.
				{ lip-shaped, —	4 <i>Labiati</i> , - - - Sage, mint, balm, germander.
				Having more petals than one,	
				{ that are cross-shaped, —	5 <i>Cruciformes</i> , - Scurvy-grafs, stock, alyssum.
				{ disposed circularly, —	6 <i>Rosacei</i> , - - - Amaranthus, poppy, passion-flower, rue, faxifrage.
				{ the flowers growing in umbels,	7 <i>Umbellati</i> , - - Hemlock, chervil, angelica.
				{ emerging from the tube of the calyx,	8 <i>Caryophyllaci</i> , - Pink, lychnis, thrift.
				{ disposed like those of the lily,	9 <i>Liliacei</i> , - - - Asphodel, hyacinth, iris, tulip, lily, crown-imperial.
				{ shaped like a butterfly,	10 <i>Papilionacei</i> , - Vetch, lupine, trefoil, pea.
				{ of various figures, —	11 <i>Anomali</i> , - - Balsam, violet, fumatory, dycr's-weed, monk's-hood, frax-
				the flowers compound,	inella, orchis, columbine.
				{ with hollow florets, —	12 <i>Flosculosi</i> , - Thistle, burdock, tanfy, cud-weed, scabious, teazel, globe-
				{ with florets flat above and hollow below,	13 <i>Semiflosculosi</i> , - Dandelion, goat's-beard, hawk-weed.
				{ with hollow and flat florets, —	14 <i>Radiati</i> , - - Aster, golden-rod, groundfel, feverfew, marigold, sun-flower.
Trees and shrubs;	without petals,	—	—	15 <i>Apetali</i> , - - - Asarabacca, dock, amaranthus, hemp, nettle, and the graffes.	
				16 <i>Spermatophorae</i> , - The ferns.	
				17 <i>Aspermae</i> , - - Mosses, mushrooms, sea-weed.	
				18 <i>Apetali</i> , - - - Ash, box, fig.	
				19 <i>Amentacei</i> , - - Walnut, oak, beech, fir, cypress.	
				20 <i>Monopetali</i> , - - Buckthorn, privet, jessamy, olive, lilac, elm, acacia, elder,	
				honey-suckle.	
				21 <i>Rosacei</i> , - - - Sumach, lime, tamarisk, horse-chestnut, nettle-tree, ivy, vine,	
				maple, tea, peach, cherry, palms, apple, rose, myrtle,	
				medlar.	
	with more petals than one,	—	—	22 <i>Papilionacei</i> , - Broom, St. John's-bread, coral-tree, false acacia, coronilla.	
				disposed circularly like those of the rose,	
				shaped like a butterfly,	

Observation.—The 4th, 5th, 7th, 9th, 10th, 13th, 14th, and 17th classes of this method are true natural families.

ANALYSIS of the celebrated SEXUAL SYSTEM of LINNÆUS.

According to this ingenious Method all Vegetables are furnished with FLOWERS, which are either

Stamina and pointal in the same flower,							
Male and female organs distinct,							
Stamina not united either above or below,							
Generally of equal length,							
	IN	NUMBER.		CLASSES.		EXAMPLES.	
One,	—	—	—	1 <i>Monandria</i> ,	-	Ginger, Indian arrow-root, turmeric, blite.	
Two,	—	—	—	2 <i>Diandria</i> ,	-	Jeffamine, privet, olive, lilac, speedwell.	
Three,	—	—	—	3 <i>Triandria</i> ,	-	Valerian, tamarind, iris, and the grasses.	
Four,	—	—	—	4 <i>Tetrandria</i> ,	-	Scabious, teazel, madder, holly, woodroof.	
Five,	—	—	—	5 <i>Pentandria</i> ,	-	Bell-flower, bind-weed, mullein, thorn-apple, peri- winkle, and the rough-leaved and umbelliferous plants.	
Six,	—	—	—	6 <i>Hexandria</i> ,	-	Snow-drop, narcissus, tulip, aloe, hyacinth.	
Seven,	—	—	—	7 <i>Heptandria</i> ,	-	Horse-chefnut.	
Eight,	—	—	—	8 <i>Octandria</i> ,	-	Indian-cress, heath, French-willow.	
Nine,	—	—	—	9 <i>Enneandria</i> ,	-	Bay, rhubarb.	
Ten,	—	—	—	10 <i>Decandria</i> ,	-	Fraxinella, rue, rhododendron, lychnis.	
Twelve,	—	—	—	11 <i>Dodecandria</i> ,	-	Purslane, house-leek, asarabacca.	
Many, frequently twenty, attached to the calyx,			—	12 <i>Icosandria</i> ,	-	Peach, medlar, apple, rose, cinquefoil.	
Many, generally upwards of twenty, not attached to the calyx,			—	13 <i>Polyandria</i> ,	-	Herb-christopher, poppy, lark-spur, columbine.	
Of unequal length,							
	Two long, and two short,	—	—	14 <i>Didynamia</i> ,	-	Savory, hyssop, ground-ivy, balm, toad-flax, fox- glove, agnus castus, bear's-breech.	
	Four long, and two short,	—	—	15 <i>Tetradynamia</i> ,	-	Scurvy-grass, candy-tuft, water-cress, stock, woad.	
Stamina united							
	by the filaments, into one body,		—	16 <i>Monadelphia</i> ,	-	Geranium and the mallow tribe.	
	into two bodies,		—	17 <i>Diadelphia</i> ,	-	Fumatory, milk-wort, and the pea-bloom flowers.	
	into many bodies,		—	18 <i>Polyadelphia</i> ,	-	Orange, chocolate-nut, St. John's-wort.	
	by the anthers or tops, into a cylinder,		—	19 <i>Syngenesia</i> ,	-	Violet, balsam, cardinal-flower, and the flowers termed compound, as dandelion, fucory, thistle, cudweed, tansey, blue-bottle.	
Male organs (stamina) attached to, and standing upon the female (pistillum).			—	20 <i>Gynandria</i> ,	-	Orchis, ladies-slipper, arum, vanelloe, birth-wort, passion-flower.	
Stamina and pointal in different flowers,							
	on the same plant,	—	—	21 <i>Monoecia</i> ,	-	Mulberry, nettle, oak, cypress, fir, cucumber.	
	on different plants,	—	—	22 <i>Dioecia</i> ,	-	Willow, hop, spinach, poplar, mercury, juniper.	
	on the same, or different plants along with hermaphrodite flowers,	—		23 <i>Polygamia</i> ,	-	White hellebore, pellitory, orach, fig.	
Or lie concealed from view, and cannot be distinctly described.			—	24 <i>Cryptogamia</i> ,	-	Ferns, mosses, mushrooms, flags.	

BOTANICAL DICTIONARY.

A C U

A in composition signifies *without*, as *herbæ acalyces*, herbs or plants that want the calyx: *herbæ acaules*, plants that want the *caulis* or stem.

ACALYCES *Plantæ*, (from *a* priv. and *calyx*), having no calyx, or flower-cup. *Vide* CALYX.

This is the name of the 15th class in Wachendorffius's Natural Method, and consists of such plants as have no flower-cup.

ACANACEÆ, the name of the 12th class in Cæsalpinus's Systematic Method, consisting entirely of compound flowers. It answers to part of Linnæus's class *Syngenesia*, and is exemplified in the dandelion, (*leontodon*). *Vide* SYNGENESIA.

ACAULES *Herbæ*, (from *a* priv. and *caulis*); herbs that want the *caulis* or stem. The 20th class, or family, in Magnolius's Method. *Vide* CAULIS.

ACINI, the small berries which compose the fruit of a mulberry, bramble, strawberry, &c.

ACOTYLEDONES, (from *a* priv. and *cotyledon*); plants so called whose seeds are not furnished with *cotyledons*, or lobes, and consequently, put forth no seminal leaves. All the mosses are of this kind. *Vide* COTYLEDONES.

ACULEUS, (from *acus*, a needle, of which Priscian considers it, as well as *acicula*, to be a diminutive, all of them, probably, derived from the Greek *ἄκνη*, or *ἄκῆς*, *cuspis*, a point); a prickle, or sharp point. A species of armature, or offensive weapon, with which the stems and branches of

several plants are furnished. *Vide* ARMA. It is particularly remarkable in rose, raspberry, currant, and berberry bushes.

The prickles differs from the thorn (*spina*), another species of armature, or defence against animals, in being only a prolongation of the *cortex* or outer bark of the plant, and in no sort connected with, or protruded from the wood. This is apparent from the facility with which such prickles are detached from the stem along with the bark: whilst the other, and more rigid species of weapon, being an expansion or process of the lignous body, cannot be detached without rending and tearing the substance of the wood. *Vide* SPINA.

Duhamel compares prickles on the surface of plants, to the nails and claws of animals.

Prickles are either,

Recti, straight; as in *solanum indicum*;

Incurvi, bent inwards; as in *mimosa cineraria*;

Recurvi, bent outwards.

Tomentosi, downy, or covered with *tomentum*, a silver-white woolly appearance, as in the *solanum sanctum*. *Vide* TOMETUM.

Acerosi, chaffy; *solanum tomentosum*.

Geminati, growing in pairs; as in *euphorbia canariensis*, and *euphorbia officinarum*.

ADVERSIFOLIÆ *Plantæ*, (from *adversus*, opposite; and *folium*, a leaf); plants whose leaves stand opposite to each other, on the same stem or branch. The name of the 5th class in Sauvage's *Methodus Foliorum*, exemplified in valerian, teasel, honey-suckle, and the labiated, or lipped flowers. *Vide* LABIATUS *Flos*.

ÆSTIVALES *Plantæ*, (from *æstas*, summer); plants which flower in summer. The second division or class of Du Pas's Method or arrangement from the four seasons of the year, consisting of herbs which flower in summer.

AFORA, from *a* priv. and *fores*, a door); having no doors or valves. The name of a class in Camellus's Method, consisting of plants whose pericarpium or seed-

vessel

vessel is not furnished with the inclosure or external covering called a valvule. *Vide VALVULA.*

AGGREGATUS *Flos*, (from *aggregare*, to assemble, or collect); properly signifies a flower consisting of a number of smaller flowers, or fructifications, collected into a head by means of some part common to them all. In this view, aggregate flowers stand opposed to simple flowers, which have a single fructification, compleat in its parts, none of which are common to many flowers.

From the description of aggregate flowers, just given, it is evident that each of the smaller flowers will not constitute a complete fructification of itself; as one or two of the essential parts of fructification are only common to the whole bundle or heap. It happens, however, sometimes, that the partial flower will be furnished with a part analogous to the common part in the aggregate. Thus in compound flowers, (the *Syngenesia* of Linnæus), the florets or partial flowers are generally furnished with a proper calyx or flower-cup, though the calyx is one of the common parts in such compound flowers. The same thing occurs in several other aggregate flowers, which are not compound. Thus thrift, or sea-pink, *statice*; scabious, *scabiosa*; teasel, *dipsacus*; blue-daisy, *globularia*; button-wood, *cephalanthus*; hartwort of Crete, *tordylium*; hog's-fennel, *peucedanum*; laserwort, *laserpitium*; lovage, *ligusticum*; pistacia-nut, *pistacia*; &c. are furnished with a common and proper calyx. On the other hand, Leucadendron; silver tree, *protea*; carrot, *daucus*; cowparsnep, *heracleum*; carvy, *carum*; dill, *anethum*; parsley, *apium*; &c. though furnished with a common calyx, under different appellations, have scarce any proper flower-cups for the different florets, of which the aggregate is composed.

The common part in aggregate flowers, is either the receptacle, or the calyx. *Vide RECEPTACULUM*, and *CALYX*.

From the different structure, disposition, and other circumstances of these common parts, arises a sevenfold division of aggregate flowers: the *aggregate*, properly so called; the

compound, the *umbellate*, the *cymose*, the *amentaceous*, the *glumose*, and the *spadiceous* flowers. Vide COMPOSITUS Flos, UMBELLA, AMENTACEUS Flos, &c.

These all agree in being composed of florets, called by Linnæus, *flosculi*, which are connected by means of some part or parts common to the whole; but differ in the figure, proportion, and disposition of these parts.

The AGGREGATE FLOWER properly so called, has its florets erected on peduncles or foot-stalks: the receptacle, which is common, being dilated, or extended in breadth for that purpose. The calyx is likewise common, and universally that species called perianthium. In some flowers, each floret has a proper calyx, which is likewise a perianthium, and generally monophyllous, or of one piece. In others, there is either no proper calyx at all, as in *leucadendron*; or it is so very small, as scarcely to be discerned: as in teasel.

Striking Structures.

Scabious, *scabiosa*; has a double proper calyx.

The genus *mitchella* has two distinct flower-cups, and two florets placed upon a single germen, or fruit-bud.

The genus *morina* has likewise a double perianthium, each perfectly distinct, the one of the flower, and the other of the fruit.

Valerian, button-wood, and American hog-weed, *boerhavia*, have scarce any common calyx.

In the genus *brunia*, the proper calyx or perianthium is pentaphyllous, or consists of five distinct leaves.

These are the most remarkable exceptions to the general description of aggregate flowers, properly so called.

AGGREGATÆ, the seventh class in Royen's Natural Method; and forty-eighth order in Linnæus's *Fragmenta Methodi Naturalis*, consisting of plants whose flowers answer to the description given above.

It may not be improper here, to observe, that these Fragments of a Natural Method, have undergone several alterations since their first publication in the *Philosophia Botanica*. The number of orders, then sixty-eight, is now reduced to fifty-

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fifty-eight; and besides, that the names and places of these orders have undergone a total revolution; several genera, that formerly were ranked under one title, are now dispersed among a number of different titles or orders. To avoid confusion, therefore, let the reader keep in mind, that the Fragments I always refer to, are those published at the end of the sixth edition of the *Genera Plantarum*, printed Holmiæ, 1764, under the head *Ordines Naturales*.

To illustrate the above observation, I would remark, that these genera, *lonicera*, honey-suckle; *mitchella*, *morinda*, and *leranthus*, are removed into the order *aggregatæ*, which we are now considering, from an order entitled *cymosæ*, which is not to be found in the improved editions of the Fragments. In like manner, the genera *selago*, *conocarpus*, button-tree; and *viscum*, mistletoe; which were formerly thrown into the last order, as vague, and of difficult arrangement, now make a part of the same order of aggregate flowers.

ALA, a wing; so the word literally signifies. Among former botanists, it was used to express the angle formed by the stem with the branch or leaf.

With Linnæus, and others, *ala* is the name of a membrane, affixed to some species of seeds, and which, by its flying, helps to disperse them. *Vide SEMEN.*

Examples of the winged seed will be found in the fir, birch, and tulip-trees, *liriodendrum*; in the aggregate flower button-wood, *conocarpus*; and the umbelliferous flowers, *artedia*, and dill, *anethum*.

Meadow-rue, *thalictrum*; trumpet-flower, *bignonia*; red jasmine, *plumeria*; tickseed, *corispermum*; and queen's-july-flower, *hesperis*; are also furnished with seed-membranes of this kind.

ALÆ, the two lateral, or side petals of a papilionaceous, or butterfly shaped flower. *Vide COROLLA*, and *DIADELPHIA*.

ALBURNUM, (from *albus*, white); the soft white substance, which, in trees, is found between the *liber* or inner bark and the wood, and, in progress of time, acquiring solidity, becomes itself the wood. From its colour, and com-

parative softness, it has been filed by some writers, the fat of trees, *adeps arborum*.

The *alburnum* is found in largest quantities in trees that are vigorous; though in such as languish, or are sickly, there is a greater number of beds. In an oak six inches in diameter, this substance is nearly equal in bulk to the wood. In a trunk of one foot diameter, it is as one to three and a half; of two and a half feet diameter, as one to four and a half, &c. but these proportions vary according to the health and constitution of the trees.

The *alburnum* is frequently gnawed in pieces by insects, which lodge in the substance, and are nourished from it.

ALGÆ, flags; one of the seven families, or natural tribes, into which the whole vegetable kingdom is divided, by Linnæus, in his *Philosophia Botanica*. They are defined to be plants, whose root, leaf and stem, are all in one. Under this description are comprehended all the sea-weeds, and some other aquatic plants.

In the sexual system, they constitute the third order of the twenty-fourth class *Cryptogamia*; in Tournefort's, the second genus of the second section, (*Marinæ, aut fluviatiles*,) of the seventeenth class, *aspermæ vulgo habitæ*; and the fifty-seventh order in Linnæus's Fragments of a Natural Method.

The discoveries made in this part of the vegetable kingdom, are uncertain, and imperfect; and the attempts, in particular, to arrange flags by the parts of the fructification, have not been attended with great success. Dillenius has arranged this order of plants, from their general habit and structure; Micheli from the parts of fructification.—Each has considerable merit.

ALOPECUROIDEA, (from *alopecurus*, fox-tail grass); the name of a class, in Ray's, Montis, and Scheuchzerus's Division of the Grasses.

ALTERNÆ *Plantæ*, the name of the third and fourth classes of Sauvage's *Methodus Foliorum*, consisting of plants whose leaves are alternate: opposed to the class *Adversifoliæ* of the same author. *Vide ADVERSIFOLIÆ Plantæ*.

AMARÆ *Herbæ*, bitter herbs; the name of a division or class,

class, in Hernandez, and other botanists, who have arranged plants according to their sensible qualities.

AMENTACEUS *Flos*, (from *amentum*); having that species of calyx, called *amentum*. *Vide Infra*.

All amentaceous flowers are aggregate. *Vide AGGREGATUS Flos*.

An amentaceous aggregate flower has a filiform, or thread-shaped receptacle, along which are disposed amentaceous *squamæ*, that is, scales forming an *amentum*, thong, or catkin.

The willow-tree, *salix*; birch, *betula*; beech, *fagus*; poplar, *populus*; hazel, *corylus*; horn-beam, *carpinus*; fir, *pinus*; walnut, *juglans*; oak, *quercus*; fig-tree, *figus*; cypress, *cupressus*; and other trees, are amentaceous.

It does not appear absolutely necessary for a flower of this kind to have an *amentum* for its calyx. In fact, the lesser burdock; the genus *ambrosia*; bastard-feverfew, *parthenium*; Jesuit's-bark-tree, *iva*; pellitory, *parietaria*; the nettle, *urtica*; &c. which are reckoned by Linnæus among the amentaceous flowers, have either a perianthium or involucre for their calyx. *Vide PERIANTHIUM and INVOLUCRUM*.

The greatest part of the amentaceous flowers, belong to one of the classes *Monœcia*, or *Diœcia* of Linnæus. *Vide MONŒCIA, DIŒCIA*.

Besides the common *amentum*, several of the amentaceous flowers have a proper calyx or perianthium; as *cynomorium*; burr-reed, *sparganium*; sand-box-tree, *bura*; pistacia nut, &c. and many others.

AMENTACEÆ, the thirty-second class of Boerhaave's Method, and nineteenth of Tournefort's, comprehending trees only. In Linnæus's *Methodus Calycina*, it is the third class; in his Fragments, the fiftieth order; and in Royen's Natural Method, the fourth class.

It is not easy to give an exact description of the idea Linnæus seems to have affixed to amentaceous plants; for, in the *Philosophia Botanica*, (as we have observed in the preceding article,) he calls several flowers amentaceous, which have not an *amentum* for their calyx; and, in his fragments

of a Natural Method, the order *amentaceæ* does not contain the cypress, juniper, arbor vitæ, *thujæ*; sand-box-tree, and other conebearing-trees, whose calyx is an amentum.

In Boerhaave and Tournefort's Method, as we have remarked above, the term *amentaceous* respects trees only. In the latter, the class *amentacei* constitutes the second division of apetalous trees; that is, of trees wanting the petals, or coloured leaves; and consists of flowers, attached in a bundle, or heap, round a common thread, or slender receptacle; which thread is described under the name of

AMENTUM, catkin; (derived by Festus from the Greek ἀμμα, *vinculum sive nexus*, a bond or thong,) a species of calyx, consisting of a great number of chaffy scales, dispersed along a slender thread, or receptacle, which, from its resemblance to a cat's tail, has obtained, in English, the name of catkin; in French, *chaton*; and by many botanists, the similar appellation of *catulus*. The term *amentum* is used by Tournefort and Linnæus, and is synonymous to *julus*, *nucamentum*, and *catulus*, in other writers. *Vide* CALYX.

An amentum, as defined by Linnæus, is a composition of a calyx, and a common receptacle. The *squamæ*, or scales, that form the amentum, mix alternately with the flowers, and resemble the chaff in an ear of corn.

This species of calyx occurs frequently in the classes *Monœcia*, and *Diœcia* of Linnæus; that is, it is found to support male and female flowers, that grow either on the same root, as in the former class, or on two distinct roots, as in the latter.

In the horn-beam, *carpinus*; an amentum supports both male and female flowers, on the same root.

In the willow, *salix*; and the poplar, *populus*; an amentum supports male and female flowers on distinct roots.

Male and female flowers, when produced from the same root, are sometimes mixed together, sometimes placed at a considerable distance on the same plant. In the latter case, it is not uncommon to find an amentum supporting the flowers of one sex, and a perianthium those of the other. This

is exactly what happens in the hazel-nut, *corylus*; where the male and female flowers are removed from each other on the same plant. The male flowers form an amentum; the female flowers are inclosed by a perianthium. In like manner, the walnut-tree, *juglans*; and the sand-box tree, *bura*; have on the same root their male flowers, with an amentum; their female flowers with a perianthium.

Arbor vitæ, *thuja*; and the cypress tree, have, upon the same root, the male flowers formed into an amentum, and the female flowers into a cone. *Vide CONIFERÆ.*

In plants that have male and female flowers on distinct roots, *Diœcia*; the pistacia-nut has its male flowers only formed into an amentum; a perianthium surrounding the female. The same thing happens in the juniper-tree, and shrubby-horse-tail, *ephedra*.

Flowers that are supported by an amentum, whether male or female, or both, generally want the petals, or coloured leaves. *Vide COROLLA.* This observation is exemplified in the oak, beech, hazel, cypress, pistacia-nut, and several others.

The following are exceptions to the general rule.

In the genus *carex*, which has male and female flowers produced on the same root, the female flowers have a *nectarium*, but no petals: the male flowers have neither petals nor *nectarium*. *Vide NECTARIUM.*

The contrary of this takes place in the willow, *salix*; where the male and female flowers are produced on distinct roots. The male flowers have a *nectarium*, and want petals; the female want both.

In the poplar-tree, *populus*, both male and female flowers want petals, and are furnished with a *nectarium*.

The male flowers of the birch-tree have a proper corolla, consisting of one petal, deeply divided into four parts. The female flowers have no corolla that is perceptible.

Both male and female flowers of the walnut-tree, *juglans*, are furnished with a corolla; but this corolla is cut into six parts in flowers of the former sex; into four in those of the latter.

Horn-beam, *carpinus*; whose male flowers want the corolla, has its female flowers furnished with one in the form of a calyx, consisting of one piece, divided into six parts.

The male flowers of the juniper-tree have no corolla. The female have three rigid petals, which continue till the fruit is arrived at maturity.

ANDROGYNA *Planta*, (from *ἀνρ*, a man, and *γυνή*, a woman); a plant is said to be androgynous, which produces both male and female flowers from the same root; as the walnut, birch, hornbeam, nettle, oak, chestnut, fir, box, mulberry, hazel, cypress, cat's tail, *typha*; plane tree, and many others.

N. B. The nettle and mulberry, produce male and female flowers, either on the same, or distinct plants. *Vide* **MASCULUS Flos**, and **FEMINEUS Flos**.

Androgynous plants constitute the class *Monœcia* in Linnæus; *vide* **MONŒCIA**; and have frequently an amentum for their calyx. *Vide* **AMENTUM**.

ANGIOSPERMÆ *Herbæ*, (from *ἀγγυ*, a vessel, and *σπέρμα*, a seed); herbs, whose seeds are inclosed in a covering, or vessel; in opposition to *gymnospermæ*, where the seeds are placed naked in the bottom of the flower-cup, without any other external covering whatever. In this view, Hermannus divides all such herbs as are furnished with petals, into *gymnospermous* and *angiospermous*.

The first seven classes exhaust the division arising from the number, &c. of naked seeds: from the eighth class to the eighteenth inclusive, the herbs are *angiospermous*, or furnished with a seed vessel. The different structure of such seed-vessels, their number, and other circumstances, suggest very properly the division into classes. Thus the seed-vessel in some plants is dry, and hard, and denominated a capsule; in others, it is a pod, as in the pea, bean, cabbage; in some a berry; in some, a fleshy, or pulpy substance, containing a capsule; as the apple, pear, &c. in others, a fleshy or pulpy substance, containing a stone; as the cherry, plumb, peach. Again, some plants have only one capsule; others have two, three, or more. It is evident

evident what beautiful divisions must naturally arise from a view of the whole vegetable kingdom in this way. In fact, the greatest number of Hermannus's classes are true natural assemblages; whilst the so much boasted system of Linnæus, separates things that ought never to be disjoined, and brings together such as agree in nothing but the single circumstance that is the foundation of his method.

ANGIOSPERMIA, the name of the second order in the class *Didynamia* of Linnæus. *Vide DIDYNAMIA.*

Hermannus, we have seen, used this term in its most extensive sense. Linnæus, the professed reformer of botanical language, has restricted it to a few genera of plants, in a class, whose characteristic it is to have four stamina, two of which are long, and two short. *Vide STAMINA.*

For the particular classical characters of *Didynamia*, see the term itself.

With respect to this order, *Angiospermia*, the only essential character is, that the seeds are placed in a *pericarpium*, or vessel; a character which is constant, and distinguishes this order from the other, *Gymnospermia*, under every form.

The genus *selago*, indeed, has no proper *pericarpium*; but its single seed, instead of being lodged in the bottom of the calyx, as in the order *Gymnospermia*, is involved, or infolded by the corolla; the tube, or lower part of which is small, and narrowed for that purpose.

The stigma, in this order, is generally obtuse. *Vide STIGMA.*

Exceptions.—Fox-glove, *digitalis*; american-viburnum, *lantana*; bear's-brcech, *acanthus*; *torenia*, *selago*, and *ovieda*, have an acute stigma.

The corolla is universally monopetalous, both in this and the other order, except in the genus *melianthus*, honey-flower; which has four petals, and a nectarium of one leaf.

The corolla too, is generally ringent, or gapes.

In figwort, *scrophularia*; fox-glove, *digitalis*; *selago*, and some other genera which belong to this order, the corolla spreads at the top.

Many plants of this order, have a double stigma. Take
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the following examples: broom-rape, *orabanche*; oily purging-grain, *sesamum*; chaste-tree, *vitex*; *mimulus*, &c.

From the resemblance which the corolla of the plants of this order bears to a masque, Tournefort has distinguished them by the name of *personati*, that is masked flowers; which constitute the third class in his system. *Vide PERSONATUS flos.*

The order *Angiospermia* is synonymous to *Personatæ*, the fortieth order of Linnæus's Fragments, and makes part of the twelfth class *Ringentes*, in Royen's Natural Method. It is however to be observed, that Linnæus's Natural Order, *Personatæ*, contains several genera that do not belong to the second order of the class *Didynamia*, in his Sexual System: as speedwell, *veronica*; malabar-nut, *justicia*; hedge-hyssop, *gratiola*; vervain, *verbena*; which belong to the second class, *Diandria*.

The term angiospermous, is equivalent to Rivinus's *Semina teſta Pericarpio*, seeds covered with a pericarpium.

ANGULI *Folii*, the prominent parts of an horizontal leaf. *Vide FOLIUM.*

ANOMALÆ, (from α priv. and νόμος, a law); irregular: the name of the twenty-sixth and thirty-third classes in Ray's Method; the former, respecting herbs; the latter, trees. The eleventh class in Tournefort's Method, has also obtained this name, and consists of plants whose corolla is composed of several irregular and dissimilar pieces. The aconite, columbine, violet, fumatory, lark-spur, orchis, fraxinella, and several other plants, which have a *nectarium*, are reduced to this class of Tournefort. *Vide NECTARIUM.*

Anomalæ is likewise the name of the fourth, thirteenth, and twenty-second classes of Pontedera's System, and the ninth of Linnæus's *Methodus Calycina*, or method derived from the form, structure, and situation of the calyx.

ANTHEMIDES, the name of the eleventh class, in Cæsalpinus's System: containing a number of plants, which are furnished with several naked seeds within a common calyx, each petal or floret having a single seed. It answers to part of the *syngenesious*, or compound flowers of Linnæus;

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næus; and is exemplified in the daisy, *bellis*. Cæfalpinus's twelfth class, *Acanaceæ*, or *Cichoracæ*, contains the remaining part of the compounded flowers. *Vide ACANACEÆ*, &c.

ANTHERA, (from ἀνθή, a flower); the *Apex* of Ray, Tournefort, and Rivinus; the *Capfula Staminis* of Malpighi. *Vide Philosophia Botanica*, page 134. The anther, summit, or top of the flamen, connected with the flower, and elevated by means of the filament, or thread. *Vide STAMEN*, and *FILAMENTUM*.

From the great utility of the fine coloured dust contained within this part of the fructification, Linnæus has distinguished it by the name of *anthera*, or, *the flower* by way of eminence.

The dust, which he has denominated *Pollen*, is discharged, when ripe, for the impregnation of the plant, by the anther, which swells and bursts open for that purpose. *Vide POLLEN*.

This is a leading principle in the celebrated *Sexual System* of Linnæus.

Natural Structure.

The most natural structure of the Anther, by which I always mean the most common, or that which is found to obtain in the greatest number of plants, is, in point of situation, to be placed on the top of the filament; in point of number a single anther to each filament.

Different striking Structures.

We observed above, that the generality of plants have a single anther to each filament; the following are exceptions to the general rule.

The herb mercury, *mercurialis*; and ranunculus, have two anthers to each filament; this is styled by Linnæus, *anthera didyma*; and is frequently found in the class *Monœcia*.

Fumatory, *fumaria*; has three anthers to each filament.

Bryony, *bryonia*; has five anthers to three filaments; a
single

single anther upon one of the filaments, and the remaining four equally divided between the other two.

The chocolate-nut, *theobroma*; has five anthers to each filament.

The bean, pea, vetch, furze, trefoil, liquórice, and all the other butterfly-shaped flowers (the *Diadelphia* of Linnæus) have generally ten anthers to two filaments, or, more properly, to two sets of united stamina.

The gourd, *cucurbita*, has one anther, common to three filaments.

Dandelion, feverfew, groundsel, and all the other compound flowers, (the *Syngenesia* of Linnæus) have one anther, common to five filaments; or, to speak more properly, five anthers united in a cylinder, are placed upon five distinct and separate filaments.

The genera *chelone* and *martynia*, which belong to the class *Didynamia* of Linnæus, and consequently have four stamina, two of which are long, and two short, are very singular in their structure. Within the uppermost, or tallest pair of stamina, is placed the rudiment of a fifth filament, sharp and pointed, without an anther.

Vervain, *verbena*, though of the class *Diandria*, has four filaments, two shorter than the rest, and but two anthers. Some species of vervain have four anthers.

Hedge-hyssop, *gratiola*, likewise of the class *Diandria*, has four filaments; two shorter than the rest and barren; that is, without anthers. In some species, three anthers are wanting.

In a species of the trumpet-flower, *bignonia*, called by Linnæus *catalpa*, there are only two perfect stamina, or stamina with anthers. The three remaining rudiments of stamina, are shorter than the other two, and want the anthers.

Turmeric, *curcuma*; of Linnæus's first class, *Monandria*; has five stamina, four of which are imperfect, or, according to Linnæus, castrated; that is, want the anthers.

Some species of *geranium*, particularly that called by Linnæus *Cicutarium*, have the filaments furnished alternately

nately only with anthers; that is five anthers to ten filaments.

The anthers, we observed, are generally seated on the tops of the filaments.

The herb *paris*, and asarabacca, *asarum*, have the anthers fixed to the middle or sides of the filaments.

Birthwort, *aristolochia*, has no filaments; the anthers, which are six in number, adhere to the stigma.

In cuckow-pint, *arum*, there are likewise no filaments, unless a number of nectaria, thick at the base, and terminated with thread-shaped tendrils. The anthers are numerous, four-cornered, placed between a double row of tendrils, and adhere to the receptacle, which, in this genus, is a *spadix*. *Vide SPADIX*.

The anthers are generally furnished with one or more cells, (*loculi*,) for containing the fine dust, or vivifying powder mentioned above.

Mercury has one cell.

Hellebore, has two cells.

Orchis, three; and

Fritillaria, four.

The powder, when ripe, is discharged by the anther, which bursts, either on the side, as in most flowers; on the top, or apex, as in snow-drop; or through the whole length downwards, as in barren-wort, *epimedium*; and lion's leaf, *leontice*.

This bursting of the anthers, is styled by Linnæus, *Dehiscencia*; and where the opening is very minute, as in some species of anthers, it is termed *APERTURA*.

Terms expressing the mode of connection of the Anthers with the Filament.

ANTHERÆ ERECTÆ, erect, or straight anthers; when they are fastened by either extremity to the top of the filament; by the base, as in most plants; or by the top, as in meadow-saffron, *colchicum*.

ANTHERÆ INCUMBENTES, anthers which lie upon the filaments, or are fastened to them by the sides; opposed to *erectæ*.

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This term is exemplified in the sea-pink, *statice*; the currant-tree, *ribes*; the pink, *dianthus*; sea-daffodil, *pancratium*, &c.

ANTHERÆ VERSATILES, veering about like a vane, or weather-cock; when they are placed horizontally on the top of the filament, and consequently so poised, as to turn on it like a vane, or the needle of a compass. Exemplified in cock's-comb, *celosia*; *geranium*, *clutia*, *amaranthus*, and *eriocaulon*.

Note, the versatile anther, is a species of the incumbent.

Indian flowering-reed, and the genus *costus*, have their anthers incumbent, or attached by the sides, not to a filament, but to a nectarium, the upper-lip of which serves in the last genus, instead of a filament.

Terms of Figure and Resemblance.

Anthera Linearis, small, and slender, like a line; as *he-liocarpus*, *stapelia*, &c.

Anthera Subulata, awl-shaped, or narrowing towards the top; as in the genus *roella*.

Anthera Hastata, like a spear, or javelin, as in the genus *jacquinia*.

Anthera Oblonga, of an oblong figure, or much longer than broad; as in the capsicums, blood-flower, *hæmanthus*; and *evolvulus*.

Anthera Bicornis, with divisions like two horns; as in winter-green, *pyrola*; whortle-berries, *vaccinium*.

Anthera Bifida, parted half-way down in two; as in heath, *erica*.

Anthera Biloba, parted more than half-way down in two, with wide and concave divisions, as in eye-bright.

Anthera Sagittata, arrow-shaped; as in crocus, flax, *linum*; and the pine-apple, *bromelia*.

Anthera Cordata, heart-shaped; as in sweet-weed, *capraria*; *tinus*, *bucida*.

Anthera Reniformis, kidney-shaped; as in *ginora*, and *tradescantia*.

The kidney-shaped anther, as well as the kidney-shaped seeds, is very common in the class *Monodelphia* of Linnæus.

Anthera

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Anthera Ovata, egg-shaped; as in *limeum*.

Anthera Subovata, nearly approaching to the egg shape, as in sparrow-wort, *passerina*.

Anthera Rotunda and *Globosa*, though distinguished by Linnæus, seem to be of equal import; round, or without any angles: *calamus*, a genus of the *Hexandria* of Linnæus, furnishes an example of the former term; the herb mercury, *mercurialis*, of the latter.

Anthera Subrotunda, roundish, or a little round: as in louse-wort; *ceraftium*; american viburnum, *lantana*; orach, *atriplex*; american night-shade, *phytolacca*; bastard milk-vetch, *phaca*.

Anthera Trigona, three-cornered; as in the rose.

Anthera Tetragona, four-cornered; as in hemp, *cannabis*; the poplar, *populus*; and fraxinella, *diſtamnus*.

Anthera Lunulata, and *Lunularis*, crescent-shaped; as in the strawberry, and marsh cinquefoil, *comarum*.

These are the most remarkable terms for expressing the shape and figure of the anthers; to particularize them all, with the minute exactness of Linnæus, in his *Genera Plantarum*, would be endless, and, indeed, is altogether unnecessary.

The following terms relating to the anther, cannot be disposed under any particular head.

Anthera Acuta, sharp, or terminating in an acute angle; as in comfrey, *symphytum*; and honey-wort, *cerinthe*.

Anthera Acuminata, tapering to a point; as in fox-glove, *digitalis*; and *thlaspi*.

Anthera Obtusa, blunt, opposed to the two former; as in herb bennet, *geum*; bear's breech, *acanthus*.

Anthera Distincta, distinct, or unconnected with each other; as in most plants.

Anthera distans, a term expressing the remoteness of the anthers from each other; as in the genera *ziziphora* and *morina*.

Anthera Connivens, approaching, or inclining towards each other, opposed to the two former; as in lung-wort, *pulmonaria*; borage, *borago*; night-shade, *solanum*; and several

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genera of the class *Didynamia*, of Linnæus; as snap-dragon, *antirrhinum*; ground-ivy, *glecoma*; savory, *satureia*, &c.

Anthera Connata, *Cohærens*, united together; as in water milfoil, *utricularia*.

Anthera Incurva and *Incurvata*, bowed, or crooked; as in vervain, *verbena*; and silk cotton-tree, *bombax*.

Anthera Villosa, covered with soft hairs, woolly; as in bear's-breech, *acanthus*.

Anthera Hirsuta, rough with hair, as in the dead nettle, *lamium*; and elephant's-head, *rhinanthus*.

Anthera Membranacea, hard like parchment; as in the genus *triplaris*.

Anthera Pellucida, shining, or transparent; as in moon-feed, *menispermum*. This transparency is observed in the barren anther of the female flower only; for this genus of plants belongs to the class *Dicæcia* of Linnæus, and consequently, has its male and female flowers upon distinct roots. *Vide* MASCULUS and FEMINEUS *Flos*.

Principles of the Sexual Method.

1. Every vegetable is furnished with flower and fruit. *Vide* FLOS, and FRUCTUS.

2. The flower and fruit together constitute the fructification. *Vide* FRUCTIFICATIO.

3. The fructification, therefore, is the essence of the vegetable.

4. The essence of the flower consists in the anther and stigma. *Vide* STIGMA.

5. The anther, and stigma, therefore, constitute a flower, with or without the calyx and corolla. *Vide* CALYX and COROLLA.

6. The anther produces, and, when ripe, discharges a powder called *pollen*, which, falling upon the stigma, is absorbed by a tough and viscid humour, with which the surface of that part is covered; and passing through the style which corresponds to the vagina in animals, discharges what Linnæus calls the *aura seminalis*, for the impregnation of the germen, or ovarium below. *Vide* STYLUS and GERMEN.

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7. To speak, by analogy, therefore, the anthers may be considered as the testes; the pollen contained within them, as the *semen masculinum*, or male seed; and the filament, which elevates the anthers, as the spermatic vessels. *Vide* POLLEN and FILAMENTUM.

8. The stigma is to be considered in general, as the female organ of generation in plants.

*Arguments in support of the opinion that the Anther is the male
- organ of generation in plants.*

1. The flower universally precedes the fruit, as generation and conception precede the birth. I say universally, because the few instances which seem to contradict this assertion, are found, upon examination, to be exceptions in appearance only.

Meadow-saffron, *colchicum*; and witch-hazel, *hamamelis*; flower in autumn, and produce fruit the following spring:—a singular fact in vegetation, and which, to an inattentive observer, might suggest the opinion, that, in these plants, the flower is preceded by the fruit.

In the plantain-tree, *musca*; the germen, or seed-bud, which is very large, has attained its full-growth, but not maturity, before the male flowers appear. The fruit, therefore, does not precede the flower, even in this instance, where the germen is not impregnated by the male dust.

2. Another argument for the sexes of plants, is derived from the situation and proportion of the supposed organs of generation, the anthers, and stigma.

In an erect, or upright flower, the anthers and stigma are either of equal length, as in most plants; or the anthers are considerably taller, that the dust, when discharged, may fall upon the top of the stigma.

In an inverted flower, (*flos nutans*;) the female organ is longer than the male, for the same reason. Of this we have familiar instances in the snow-drops, campanulas, and fritillarias. It is obvious, that if the stamina were longer than the pistillum, or female organ, in such plants, no impregnation could ever, on the hypothesis of Linnæus, possibly en-

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duc : as the dust, when ripe and discharged, would fall to the ground, and never approach the stigma, which lies in the opposite direction.

In flowers that slope downwards, or droop, both organs incline towards the under side; and the anthers are generally placed immediately above the stigma. Wild fenna, *cassia*; and all the butter-fly shaped flowers, the *Diadelphia* of Linnæus, furnish examples.

In flowers that slope upwards, (*flor adscendens*); both organs are placed close under the upper side; as in the *Didynamia Gymnospermia* of Linnæus.

Thus we have seen, that the pistillum, in every instance, follows the direction of the anther; that its length is likewise regulated by the male organ; and that the fine dust discharged by the anthers does, in effect, fall upon the stigma.

In the pink, *dianthus*, the style is generally longer than the stamina: and the stigma is bent backwards, to receive the pollen, which otherwise would escape. In some species, the styles are exceedingly long, but are so rolled back, that the impregnation by the male dust can easily be accomplished without the inflection of the flower.

The long styles in the fennel-flower, *nigella*, are likewise rolled back for the same purpose.

Hitherto we have treated of the situation of the anthers and stigma, when they are placed within the same covers, and form together a fructification, which is termed by Linnæus an hermaphrodite flower.

The situation of these essential parts of fructification, is not less favourable to the hypothesis of the sexes, when they are placed within distinct covers, upon the same root, as in the class *Monœcia* of Linnæus, where the flowers that have the anther only, which he calls male-flowers, are generally placed immediately above the female-flowers, or such as have the pistillum only; and that, either upon the same, or different foot-stalks. Thus in the genera *zea*, and *coix*, Job's-tears, the male-flowers, or those furnished with the anthers, are placed above the female-flowers, upon different spikes in the former, and upon the same spike in the latter. *Vide SPICA.*

Exception.

Exception.—The genera *olyra*, *zizania*, and *poterium*, garden-burnet, have the male-flowers placed below the female; the two former on the same panicle; the latter on the same spike. *Vide PANICULA.*

In compound flowers, the *Syngenesia* of Linnæus, there are few barren plants, or that do not ripen seed; a circumstance which Linnæus accounts for from the situation of the anthers, which are, in a manner, perforated by the stigma. *Vide SYNGENESIA.*

In the order *polygamia frustranea*, of the same class, the florets in the circumference (*radius*) which are female, or furnished with the pistillum only, are never impregnated, though there are hermaphrodite flowers in the center, (*discus*); because the stigma is wanting. To this order belong the sun-flowers, centaury, &c.

In saxifrage, *saxifraga*; and several plants, where the pistillum is very short; the anthers approach and form a compact body immediately above the stigma.

This approaching of the anthers, says Linnæus, is very remarkable in the genus *celosia*, at the time of their bursting and discharging the dust.

3. Among animals, the male and female organs of generation ripen, and are in a capacity of performing their functions much about the same time.

In plants, the stigma, which is the supposed female organ, is in its greatest vigour, when the male dust is discharged by its organ the anther.

This coincidence in point of time is observed, not only in hermaphrodite flowers, or such as have the anthers and stigma contained within the same covers; but likewise in the classes *Monœcia* and *Diœcia* of Linnæus, where those organs are placed apart within different covers, on the same root, as in the former, or on distinct roots, as in the latter. In these classes, the male flowers ripen their anthers, at the very time in which the female flowers ripen their stigma. To strengthen the conclusion in favour of the sexes from the above-mentioned facts, let it be remarked, that in the plantain-tree, *musa*, where the male flowers are posterior to the

female, there is no impregnation, the pericarpium being barren, or devoid of seeds.

4. In the generality of flowers, the stigma withers and falls off, after the discharge of the pollen and fall of the anthers.

Such are the principal arguments for the sexes, arising from a general view of the structure, proportion, and situation of the supposed organs.

Experiments on these organs, give rise to a second set of arguments; the management and culture of fig and palm-trees, furnish a third sort. These, along with the opposite set of arguments, employed by Dr. Alston, and other eminent naturalists, shall be fully enumerated under the article *SEXUS PLANTARUM*, whither we refer our readers.

ANTHOPHILI, (from *άνθος*, a flower, and *φιλέω*, to love). Florists.

The varieties arising chiefly from the colours of the corolla, in the same species of plants, are the principal object of the florist. In many species of flowers, the colour is variable; as in the tulip, hyacinth, ranunculus, pink, blue bottle, violet, columbine, fumatory, &c. Such flowers, therefore, claim, in an eminent manner, the attention of the florist. *Vide VARIETAS*.

Double flowers, which are a species of monsters in the vegetable kingdom, and arise from a luxuriancy of nourishment, are likewise the delight of the florist. *Vide PLENUS Flos*, *MULTIPLICATUS Flos*, &c. *Phil. Bot.* p. 81, 240.

ANTHUS, (from *άνθος*, a flower); the flower. A term used by Columna, synonymous to the *corolla* of Linnæus.

We have seen that the petals, or coloured leaves, are not essential to the existence of a flower, which, according to Linnæus, is constituted by the presence of the anthers and stigma. *Vide Principles of the Sexual Method*, under the article *ANTHERA*.

The supposed utility of these organs in the business of generation suggested the definition. When that utility was not so much as dreamt of, we need not wonder, that the petals, the

the most conspicuous and beautiful part of the plant, should have claimed a principal regard, and even have been characterised by the name of *the flower*, by way of eminence; especially as several Systems and Methods, particularly those of Rivinus and Tournefort, are founded upon their figure, number, situation, and regularity.

APERTURA, (from *aperio*, to open); an aperture or opening; the minute opening in certain species of anthers so called. *Vide* ANTHERA.

APETALUS *Flos*, (from *a priv.* and *petalum*, a petal); having no petals, or corolla. The term was used by Tournefort, and adopted by Linnæus, and is equivalent to the *Imperfectus* of Rivinus, Khautius, and Pontedera; the *Stamineus* of Ray; the *Incompletus* of Vaillant, and the *Capillaceus* of other botanists. *Vide* COROLLA.

In almost every former system, the presence or absence of such a conspicuous part as the petals, was a leading point: in the sexual system, however, the corolla is totally disregarded in the primary divisions, which are formed solely on the number, proportion, situation, union and absence of the stamina, or supposed male organ of generation in plants. Hence we are not to expect in the *Genera Plantarum*, as in other botanical writings, a list, exhibiting at one view all the plants which are not furnished with petals: these are to be found dispersed among the different classes in that accurate and elaborate work.

In general, few of the amentaceous flowers, and fewer of the class *Cryptogamia*, containing the mosses, mushrooms, ferns, and sea-weed, are furnished with petals. *Vide* AMENTACEUS *Flos*, and CRYPTOGAMIA.

Many of the grasses likewise, want the corolla.

Christian Knaut, a Saxon, who was contemporary with Tournefort, and published a method founded upon the number and regularity of the petals, among other curious doctrines, denies the existence of apetalous flowers.

APETALÆ, the name of a division or class in most of the systematic botanists, consisting of such herbs and trees as want the corolla. Apetalous herbs are generally subdivided

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into apetalous properly so called, which want petals, but have the stamina; apetalous without flowers, which apparently want petals, stamina and calyx; as the ferns, which are dorsiferous, that is, bear their fruit on the back of the leaf: and apetalous without flower and fruit, as the mosses and mushrooms.

Apetalous trees contain, amongst others, such whose flowers have the species of calyx called *amentum*. *Vide* AMENTUM.

These are the *amentacei* and *juliferi* of Tournefort, Hermannus, and others. *Vide* AMENTACEOUS *Flos*, &c. They form a considerable part of the classes *Monœcia* and *Diœcia*, of Linnæus. *Vide* MONOECIA, &c.

APEX, the top, or summit; a term used by Tournefort, Rivinus, and Ray, synonymous to the *anthera* of Linnæus. *Vide* ANTHERA.

APEX *Folii*, the tip or upper extremity of the leaf. *Vide* FOLIUM.

APHYLLÆ, (from α priv. and $\phi\upsilon\lambda\lambda\omicron\nu$, a leaf); devoid of leaves; the name of the first class in Sauvage's ingenious *Methodus Foliorum*, consisting of plants which are entirely destitute of leaves.

To this class belong mushrooms, several of the sea-weed, rush, garlic, &c.

APYRINÆ, (*ap̄yr̄inus et ap̄yr̄ēnus*, without stone or kernel, or a small one, from the Greek α , privativ. and $\pi\upsilon\rho\eta\nu$, *nucleus*, a kernel), the name of the fifty-third class in Lud. Gerard's Arrangement of the Plants that are natives of Provence, in France. It consists of two genera, the myrtle and pomegranate.

AQUATICÆ *Plantæ*, (from *aqua*, water); plants that grow in, or near water. *Aquatics*. The name of a class in Dodoneus's, Porta's, and J. Bauhin's *Methods*.

When artificial arrangement was yet in its infancy, systems were constructed, not as in modern times, from the structure and situation of a particular part, but from a complex view of the whole plant. Neither was this view confined merely to the habit; it included every circumstance, however

however different; the place of growth, the time of flowering, the medicinal and æconomical uses, the sensible qualities, and several other particulars, which by modern botanists, the only genuine systematical writers, are necessarily disregarded as primary characters, but deserve every consideration as secondary marks of distinction and useful auxiliaries for obtaining a complete knowledge of the plant.

ARBOR, a tree; a perennial plant which rises to a very great height, with a simple, woody, and durable stem, or trunk. By these characters, are trees, with great accuracy, distinguished from herbs, whose stems are frequently compound, herbaceous, or succulent, and die down to the root every year.

All trees too are perennial, as is evident from the characters just enumerated: many herbs are either annual, that is, of one year's duration; or biennial, of two; those only are perennial, whose roots, not perishing with the stems, continue a long time under the surface of the ground, and put forth a new stem every year. *Vide HERBA.*

Upon these obvious and striking differences was founded the very ancient division of vegetables, into herbs and trees; though, perhaps, that distinction was principally suggested by the difference of size and duration of the plants in question. Be that as it may, the division was esteemed so natural and spontaneous, that, from the time of Aristotle and Theophrastus to the present age, it has obtained a principal place in almost every system, those of Rivinus and Linnæus excepted, which mix herbs and trees promiscuously together.

Among the celebrated names in botany, which have retained the ancient distinction, are numbered Cæsalpinus, the father of systematic botany; Morison, Hermannus, Christopher Knaut, Boerhaave, Ray, Pontedera, and Tournefort. The latter, rather than omit a division, through custom become necessary, chose to hurt the elegance and uniformity of his plan; and, in fact, spun out into twenty-two classes, what, without such a division, might have been easily comprised in seventeen.

On the opposite side are ranged, besides Rivinus and Linnæus, already mentioned, Christian Knaut, Ludwig, and other names of less note.

The distinction into trees and shrubs, though of equal antiquity, is neither so obvious, nor are its limits so accurately ascertained. In fact, of the numerous characteristic differences which have been suggested by botanical writers, not one is perfectly satisfactory. To say, with Tournefort, that trees are universally taller than shrubs, is, in effect, saying nothing, unless a certain fixed, immutable standard were previously established. Besides, every thing respecting dimension is so variable in its nature, and depends so much upon difference of climate, soil and management, that were a standard of this kind attempted to be established, the greatest confusion would ensue; and the same plant in different countries, and even in opposite soils in the same country, would receive different appellations, according as it exceeded, or came short of the given standard.

Thus the *ricinus*, or palma-christi; the dwarf rosebay, *rhododendron*; the strawberry-tree, *arbutus*; and several others, which grow to the size of very large trees in warm climates, are, in this country, equalled and even exceeded in height by many of our smallest shrubs.

The difference of soil and culture in the same climate, produces a like diversity in dimension. Thus to take an example from herbaceous vegetables, the marigold, which, in a fat and moist earth rises two feet high, scarce exceeds the same number of inches in a dry and gravelly soil.

Nature, says Linnæus, has put no limits between trees and shrubs. Where then are we to search for the foundation of this distinction? Not in the difference of size and height, for nothing can be more fallible. Either, he continues, there are no limits at all, or they are to be found in the buds; and the plants are stiled trees, when their stems come up with buds; shrubs when they arise without buds: but this distinction is sufficiently confuted by its author, who immediately subjoins, that there are seldom any buds upon the very large trees in India; which must, therefore, notwithstand-
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ing their great height, according to this definition, be reckoned shrubs.

The learned Dr. Alston, in his *Tyrocinium Botanicum*, seems to consider the distinction into trees and shrubs as a true natural distinction, and endeavours to trace its foundation in the internal structure of the plants themselves. All trees, says he, whether they bear buds or not, are covered with the two barks, the outer and inner, called by botanists, *cortex* and *liber*. Shrubs differ from herbaceous vegetables in the duration of their stems; from trees in the nature of their covering, which is not a bark, but a cuticle, or simple skin.

This thought is ingenious; but the fact on which it depends is not sufficiently ascertained.

The farther distinction into shrubs and under-shrubs, which is exceedingly arbitrary and indeterminate, was first suggested by Clusius, in a work entitled, *Rariores & Exoticæ Plantæ*, published in 1576; and afterwards adopted by Cæsalpinus, and others. *Vide* FRUTICES.

ARBUSTIVA, (from *arbusum*, a copse of shrubs, or trees; an orchard, or vineyard;) the thirty-ninth order of plants in the former editions of Linnæus's Fragments of a natural Method, containing these genera, the myrtle, mock-orange, *philadelphus*; *eugenia*, guayava, or bay-plumb, *psidium*; and the clove-tree, *caryophyllus*. The first four belong to the class *Icosandria* in the sexual method; the last to the class *Polyandria*.

In the latest editions of these fragments, the above-mentioned genera form the nineteenth order, under the title of *Hesperideæ*. *Vide* HESPERIDÆ.

ARILLUS, (from *arēre*, to be dry or parched,) a term invented by Linnæus, and defined to be the proper exterior coat or covering of the seed, which, drying, falls off spontaneously.

All seeds are not furnished with an *arillus*; in many, a dry covering, or scarf-skin, supplies its place. In jessamine, hound's tongue, *cynoglossum*; cucumber, *fraxinella*, *dictamnus*; staff-tree, *clastrus*; spindle-tree, *euonymus*; African spiræa,

spiræa, diofma; and the coffee-tree, *coffea*; it is very conspicuous.

In the genus hound's tongue, four of these *arilli*, or proper coats, each infolding a single seed, are affixed to the style, or pointal; and in this circumstance, says Linnæus, does the essence of the genus consist.

In *fraxinella*, the *arillus* is common to two seeds.

The staff-tree has its seeds only half-involved with this cover.

The *Arillus* is either

Baccatus, succulent, and of the nature of a berry, as in the spindle tree, *euonymus*.

Cartilagineus, cartilaginous, or gristly, as in the African *spiræa, diofma*.

Coloratus, coloured, as in the staff-tree.

Elasticus, endued with elasticity for dispersing the seeds; as is remarkable in the African *spiræa, diofma*; and *fraxinella*.

Scaber, rough, and knotty, as in hound's tongue.

Although covered with an *arillus*, or other dry coat, seeds are said to be naked, (*semina nuda*,) when they are not inclosed in any species of *pericarpium*, or fruit-vessel; as in the grasses, and the *labiati*, or lipped flowers of Tournefort; which correspond to the *Didynamia Gynnospermia* of Linnæus.

Seeds are said to be covered, (*semina teſta*,) when they are contained in a fruit-vessel, whether capsule, pod, or pulpy pericarpium of the apple, berry, or cherry kind. *Vide SEMEN*.

This exterior coat of the seed is, by some former writers, styled *Calyptra*. *Vide CALYPTRA*. By Scopoli, the ingenious author of the *Flora Carniolica*, it is termed *Theca*, (a sheath or case).

The different skins, or coverings of the seed, are adapted, say naturalists, for receiving the nutritive juices, and transmitting them within.

ARISTA, (derived, as the preceding term, from *areo*,

to be dried), the awn, sharp beard, or point, issuing from the husk, or scaly flower-cup, of the grasses, called *Gluma*. *Vide GLUMA*.

The greatest part of the plants that belong to the natural order of grasses, are *hermaphrodite*, that is, bear flowers, which have the stamina and pistillum within the same covers. *Vide HERMAPHRODITUS Flos*.

Some, however, are *androgynous*, that is, have both male and female flowers, produced on the same root ; as the genera *zea*, *coix*, *olyra*, *tripsacum*, *zizania*. *Vide MASCULLUS Flos*, and *ANDROGYNA Planta*.

Others are *polygamous*, that is, bear hermaphrodite flowers, and flowers of either, or of both sexes, on the same, or on different roots : as the genera *andropogon*, *holcus*, Indian millet ; *apluda*, *ægilops*. *Vide POLYGAMIA*.

The hermaphrodite grasses are all reduced, except three, (vernal grass, *anthoxanthum* ; *cinna*, and rice, *oryza* ;) under Linnæus's third class, *triandria* ; the androgynous belong to the class *Monœcia* ; and the polygamous to the class *Polygamia*. *Vide MONŒCIA, POLYGAMIA*.

Of hermaphrodite grasses, some want the beard, as the genus *poa*.

A like deficiency is observed in the genera *zea*, *coix*, &c. which range under the head of androgynous grasses.

Both male and female flowers of the genus *olyra*, have one of the valves only of the husky calyx terminated with a beard.

The male flower of the genus *zizania*, wants the beard ; the husky corolla of the female, (*corolla gluma*,) at the termination of its large outward valve, or petal, is furnished with a very long one.

Of polygamous grasses, *andropogon* and *holcus* want the *arista* in the calyx ; the husk of the corolla of the hermaphrodite flower, in the former, has a long, sharp, and twisted beard, proceeding from the base of the greater valve : in the latter, the outward valve is furnished with a very rigid beard of the same kind. The inner valve has none.

The valves of the husky calyx of the hermaphrodite
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flower,

flower, in the genus *ægilops*, are furnished with various beards.

The outer valve of the husky corolla, in the same genus, is terminated with a double or triple beard. The inner valve has none.

Aristæ are either

Divaricatæ, scattered, or placed at a considerable distance from each other, opposed to *confertæ*, as in *bromus squarrosus*.

Dorsales, fixed to the back, or outward part of the husk, as in oat, and fox-tail grass, *alopecurus*.

Erectæ and *reclæ*, upright, perpendicular; as in *bromus*, and winged spike-grass, *stipa*.

Filiformes, thread-shaped, as the *aristæ* of a species of panic-grass, called by Linnæus, *panicum birtellum*.

Glutinosæ, covered with a stiff glue; as in *panicum birtellum*.

Gemiculatæ, jointed; as in vernal grass, *anthoxanthum*.

Lævæ, smooth, or polished, without any roughness; as in *avena sativa*.

Lanatæ, woolly, covered with a soft substance like wool; as in *stipa pennata*, and *aristida plumosa*. In the last genus, there are three *aristæ*; the intermediate one only is woolly.

Longissimæ, very long; as in the winged spike-grass, *stipa*.

Patulæ, spreading; as in *aristida*, and *bromus scoparius*.

Pilosæ, hairy, covered with *pili*; as in *stipa tenacissima*, where the *aristæ* are hairy at the base.

Plumosæ, feathery; as in *geum*.

Recurvæ, bent back; as in *andropogon*, and *agrostis canina*.

Retortæ and *Reflexo-tortæ*, twisted backwards; this is exemplified in one of the *aristæ* of the genus *lagurus*.

Sanguineæ, of a blood colour; as in *panicum birtellum*.

Setaceæ, bristly, covered with *setæ*, (*Vide PUBES*); as in the *agrostis canina*, and *hordeum jubatum*.

Terminales, fixed to the apex of the husk, as in *olyra*, and *lagurus*.

Tortiles, wreathed or twisted like a rope; as in *andropogon*, *stipa*, and *aira montana*. The beards of oats are twisted into a spiral form.

Villosæ,

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Villosæ, hairy, almost synonymous with *pilosæ*; exemplified in *lagurus*.

Uncinata, hooked; as in *panicum hirtellum*, and *geum urbanum*.

Note, the seeds of herb-bennet, *geum*, are furnished with long jointed beards.

ARMA, arms; offensive weapons. One of the seven kinds of *Fulcræ*, or props of plants, enumerated by Linnæus in the *Delineatio Plantæ*, at the beginning of his System of Nature; and by Elmgren, a scholar of Linnæus, in his *Termini Botanici*, first published in the *Amœnitates Academicæ*.

For the numerous variations these *fulcræ* have undergone, see the article FULCRA.

In the latest editions of the *Philosophia Botanica* that I have seen, no mention is made of *arma*, in enumerating the *fulcræ*; in its stead are retained the antient FULCRA, *aculeus*, and *spina*, prickles and thorns; which, in the *Delineatio Plantæ* abovementioned, are regarded only as species: *arma* being the genus.

The different species of armour with which plants are furnished, are *aculei*, prickles; *spinæ*, thorns; *furcæ*, forks; and *stimuli*, flings. Vide ACULEUS, SPINA, &c.

They are intended, say Naturalists, to keep off animals from hurting the plants.

AROMATA, (Gr. *ἀρώματα*, all sweet spices, herbs, seeds, and roots) the name of a division in Ray's, Monti's, and Sœuecherus's arrangement of the grasses; consisting of such as have an odoriferous quality.

AROMATICÆ *Plantæ*, odoriferous, of a strong agreeable smell and taste; aromatics; the name of a class in Dioscorides, Clusius, Hernandez, J. Bauhin, Johnston, Rumphius, and several other botanists, who have arranged plants according to their virtues and sensible qualities.

The plants of the order *Didynamia Gymnospermia* of Linnæus, which correspond to the *labiati*, or lipped flowers of Tournefort, are all aromatics.

ARTICULUS, that part of the *culmus*, or stalk in grasses,

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grasses, which is intercepted, or lies between two joints, or knots. *Vide* CULMUS.

ARUNDINACEÆ *Plantæ*, (from *arundo*, a reed); the twenty-seventh class in Ray's Method, consisting of trees, whose seeds are *Monocotyledonous*; that is, furnished with a single *cotyledon*, or lobe. The *Palms* belong to this class. *Vide* COTYLEDONES.

ASCYROIDEÆ, (ASCYRUM, *Plin.* St. John's or St. Peter's wort), the name of the thirteenth class in Scopoli's *Flora Carniolica*, consisting of *Ascyrum*, *Hypericum*, and such genera as resemble them in habit and structure.

ASPERIFOLIÆ *Plantæ*, (from *asper*, rough; and *folium*, a leaf); rough leaved plants. The name of a class in Hermannus, Boerhaave, and Ray's Methods, consisting of plants which have four naked seeds, and whose leaves are rough to the touch.

In Tournefort's system these plants constitute the third section or order of the second class; and in Linnæus's Sexual Method, they make a part of the *Pentandria Monogynia*. *Vide* PENTANDRIA.

ASPERIFOLIÆ, the forty-first order of plants in Linnæus's Fragments of a Natural Method.

List of Genera contained in this Natural Order.

SECTION I.

Rough-Leaved Plants, with four naked Seeds. *Vide* SEMEN.

Linnæan Genera.		English Names.
<i>Anchusa</i> ,	—	— Bugloss.
<i>Asperugo</i> ,	—	— Small wild Bugloss, or Great Goose Grass.
<i>Borago</i> ,	—	— Borage.
<i>Cynoglossum</i> ,	—	— Hound's - Tongue, Venus's Navel-Wort, or Lawn.
<i>Echium</i> ,	—	— Viper's Bugloss.
<i>Heliotropium</i> ,	—	— Turnsole.
<i>Lithospermum</i> ,	—	— Gromwell, or Graymill.
<i>Lycopsis</i> .		
<i>Myosotis</i> ,	—	— Mouse-ear Scorpion-Grass.
		<i>Onosma.</i>

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Linnæan Genera.

English Names.

Onosma.

Pulmonaria, — — Lungwort, or Sage of Jerusalem.

Symphytum, — — Comfrey.

SECTION II.

Rough-Leaved Plants with two naked Seeds.

Cerithe, — — Honey-wort.

SECTION III.

Rough-Leaved Plants with five naked Seeds.

Nolana.

SECTION IV.

*Rough-Leaved Plants with covered Seeds; Vide SEMEN.
or a Seed-Vessel, whether pulpy, or dry.*

1. *With a pulpy Seed-Vessel, with, or without a Stone; (Drupa, or Bacca.)*

α *With a Stone, (Drupa.)*

Cordia, — — Sebesten.

Varronia.

β *Without a Stone, (Bacca.)*

Tournefortia.

Ehretia.

2. *With a dry Seed-Vessel, or Capsule.*

Patagonula.

Habit and Structure of the Plants of this Order.

Most of the plants of this order are herbaceous and perennial.

The ROOTS are branched and fibrous.

The STEMS and branches rounded.

The BUDS of a conic form, naked, or without scales.

The LEAVES simple, alternate, commonly very rough to the touch, and in most of the herbaceous plants, sessile, that is, attached to the stem and branches without any footstalk. In the few trees, however, of this order, the leaves

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have a foot-stalk, the lower part of which, after the fall of the leaves, remains on the branches like a spine or thorn.

Note, in the genus *Tournefortia*, which is of the tree kind, the foot-stalk of the leaves is jointed.

In some species of *Tournefortia*, *varronia*, and turnsole, *heliotropium*; the leaves are placed almost opposite; and in the small wild bugloss, *asperugo*, there are three or four leaves dispersed in whirls round the stem. The leaves at the bottom of borage are opposite: those at the top, alternate.

The HAIRS, (*pili*,) are simple, and generally very rough to the touch.

The FLOWERS are in some genera solitary; but commonly collected into a *spike*, or *corymbus*, (*Vide* SPICA, CORYMBUS), and do not proceed from the angle formed by the stem or branch with the leaf, as in many plants, but from the side of the leaf, or from that part of the stem which is opposite to it.

In the genus *varronia*, the spike of flowers proceeds from the *axilla* or angle of the leaves.

The flowers are generally arranged on the side of the *spike*, or *corymbus*, and unaccompanied with any scale.

They are almost universally hermaphrodite; in a few species of scabsten, *cordia*, male and female flowers are produced upon different roots.

The CALYX, or flower-cup, is monophyllous, that is, composed of one leaf, which is divided from three to ten equal or unequal parts. Those of the first section with four naked seeds, have the calyx deeply divided into five segments, which, as in the other genera of this order, are permanent, accompanying the germen to its maturity. Indeed, in the greatest number of rough-leaved plants, the calyx serves as a *pericarpium* or seed-vessel, and therefore could not be taken away, without injuring the tender seeds which are nourished in its bosom.

The COROLLA, or coloured inner cover of the flower, is monopetalous, that is, composed of one petal, which, in different plants, is bell—funnel—salver—and wheel-shaped. The divisions of the limb or upper part of the petal, are generally

generally five in number, alternate with those of the calyx, equal, and regular, except in viper's bugloss, *echium*; where the segments are unequal.

The STAMINA are five in number; alternate with the divisions of the corolla, and opposite to those of the calyx. They are equal, attached to the tube of the corolla a little above its origin, and of the same height:

The ANTHERS or summits, are in some genera *connivent*; that is, approach and form a compact body above the filaments. This is particularly exemplified in borage; lung-wort, *pulmonaria*; and the genus *tournefortia*.

The PISTILLUM, pointal, or female organ, is generally composed of a slender style, of the same length with the stamina, and crowned with a simple stigma. It proceeds from a germen, which in some plants is undivided, but generally split into four. In hound's-tongue, the style is permanent.

In all the plants of the three first sections, there is properly no seed-vessel; the calyx, in these genera, supplies its place, and continues till the seeds are arrived at maturity.

In the plants of the fourth section, the seed-vessel is either a *capsule*, as in *patagonula*; pulpy with a stone, (*drupa*), as in seabesten, *cordia*; or pulpy without a stone, (*bacca*), as in *tournefortia*.

The SEEDS are generally four in number, and lodged in the bottom of the calyx.

In honey-wort, *cerinthe*, there are two seeds of a hard bony nature, each of which is furnished with two cells; and in the genus *nelana*, the number of seeds is five.

Sebesten, and the genus *varronia*, have a stone or nut, which is divided into four cells.

The plants of this natural order are mostly mucilaginous, with little taste or smell.

Most of the rough-leaved plants, particularly those of the first section, are used in medicine. The flowers are esteemed cordial; the leaves and roots vulnerary and astringent; and the hard bony seeds, particularly those of Gromwell, *lihosphermum*, are reckoned powerful promoters of urine.

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A decoction of the roots and leaves of comfrey, (*Symphytum officinale*;) has been successfully applied in violent coughs, and disorders of the lungs and breast.

Externally, these plants are used for burnings, and poisonous bites; they extirpate warts, and relieve disorders in the loins.

AUTUMNALES *Plantæ*, (*autumnus*, autumn,) plants that flower in autumn. The third division in Du Pas's arrangement, from the time of flowering.

AXILLA, an arm-pit; the angle formed by the branch and stem, or by the leaf with either.

Leaves are said to be *axillary*, which proceed from the angle formed by the stem and branch. *Vide FOLIUM.*

B.

BACCA, a berry; defined by Linnæus to be a pulpy *pericarpium* or seed-vessel without a valve, inclosing several seeds which are naked, that is, have no other covering. The seeds are sometimes dispersed promiscuously through the pulp, as in the water-lily; but generally placed on receptacles or foot-stalks within the pulp, as in the currant, gooseberry, raspberry, &c.

In the lesser burdock, *xanthium*, the seed-vessel, which is called by Linnæus, though improperly, a berry, is dry, and contains within it a nut furnished with two cells.

The seed-vessel or fruit of the *capsicum*, which the same author also improperly styles a berry, has no pulp, and is hollow within.

From these and other instances which might be produced, we may safely affirm, either, that the definition of a berry just now given is imperfect, or that the seed-vessels of a great number of plants are, in the *Genera Plantarum*, wrongly denominated berries. To say truth, it is sometimes difficult to refer a pericarpium to the head of *bacca*, or *drupa*, as defined by Linnæus. The only difference betwixt these seed-vessels consists in the nature of the seeds inclosed within

within the pulp. In the latter is inclosed a nut, or stone; in the former, a number of naked seeds. These definitions being established, to what head are we to refer the lesser burdock, which, as we have seen, contains a nut within a dry pericarpium? Why, certainly, to the head of *drupa*, as well as the walnut, and many other plants which have a dry seed-vessel inclosing a stone, or nut. On the other hand, we may refer the walnut, and other dry pericarpiums, which inclose a nut, with equal propriety, to the head of *bacca*, as the lesser burdock, the seed-vessel of which is denominated, by Linnæus, a berry.

The very different fruits, or, to speak more properly, seed-vessels of the sumach; night-shade, *solanum*; sow-bread, *cyclamen*; medlar, *mespilus*; orange, *citrus*; and pineapple, *bromelia*; are all denominated berries.

The berry is commonly round, or oval, and frequently furnished, like the apple, and other fruits of that kind, with an *umbilicus* or small cavity, at the end opposite to the foot stalk.

A berry is said to be *proper*, when it is formed of the pericarpium or seed-vessel; *improper*, or *singular*, when it is formed of any of the other parts.

The latter species of formation is frequent, and admits of numerous varieties.

The following are the most considerable.

In the mulberry, rose, blite, and myrtle-leaved sumach, *seriaria*; a large, fleshy and succulent calyx becomes a berry.

In the strawberry and cashew nut, *anacardium*; a berry is formed of the common receptacle; in the raspberry and adonis, of a seed; in marvel of Peru, *mirabilis*, of the *nectarium*; (*Vide* NECTARIUM) in garden-burnet, *poterium*, of the tube of the corolla, which hardens and shuts for that purpose; in spindle-tree, *euonymus*, of a succulent *arillus*, or proper seed-covering. *Vide* ARILLUS.

The berry does not naturally gape, or burst; the dispersion of the seeds within the pulp being designed to be performed by means of animals. *Vide Philosophia Botanica*, p. 75. 87.

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BACCIFERÆ *Herbæ*, (from *bacca*, a berry; and *fero*, to bear); herbs that have a berry for their *pericarpium* or seed-vessel.—The sixteenth class in Morrifon, seventeenth in Hermannus, first in Christ. Knaut, twenty-fifth in Boerhaave, and seventeenth in Ray's Method; consisting in some systems of all such plants as have a pulpy fruit, whether of the apple, berry, or cherry kind; in others, with more propriety, of such only as have that species of pulpy pericarpium, called *bacca*. *Vide* **BACCA**.

BARBA, a beard; a species of *pubes* or down, with which the surface of some plants is covered. *Vide* **PUBES**.

The term was invented by Linnæus, and made its appearance in the *Delineatio Plantæ*, without any explanation. Its meaning, therefore, has not been accurately ascertained: though, by its application in the *species plantarum*, it seems to signify a tuft or bunch of strong hairs terminating the leaves. *Mesembryanthemum barbatum*, furnishes an example.

BARBA *Corollæ ringentis*, the lower-lip of a ringent, or gaping corolla. *Vide* **COROLLA**.

The term was invented by Rivinus, and stands opposed to *galea ringentis*, the upper-lip. *Vide* **GALEA corollæ ringentis**.

BARBATUS *Flos*, (from *barba*, a beard); a bearded, gaping, or ringent flower; a term used by Rivinus, synonymous to the *ringens* of Linnæus, and the *labiatus* and *personatus* of Tournefort. *Vide* **COROLLA**, and **LABIATUS Flos**.

The ringent, or gaping flowers, form the *Didynamia* of the Sexual Method. *Vide* **DIDYNAMIA**.

BICORNES *Plantæ*, (from *bis*, twice, and *cornu*, a horn); plants whose anthers have the appearance of two horns.

The name of the eighteenth order in Linnæus's Fragments of a Natural Method.

List of the Genera contained in this Natural Order.

SECTION I.

Plants with horned Anthers, and four Stamina.

Linnæan Genera.

English Names.

Blaeria.

SECTION

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SECTION II.

Plants with horned Anthers, and five Stamina.

(Pentandria of Linnæus.)

Linnæan Genera.

English Names.

Azalea.

Myrsine, — — African Box.

SECTION III.

Plants with horned Anthers, and eight Stamina.

(Octandria of Linnæus.)

Erica, — — Heath.

Vaccinium, — — Whortle, or Bilberries.

SECTION IV.

Plants with horned Anthers, and ten Stamina.

(Decandria of Linnæus.)

Andromeda.

Arbutus, — — Strawberry-tree.

Clethra.

Epigæa, — — Trailing Arbutus.

Gaultheria.

Kalmia, — — Dwarf-Laurel of America.

Ledum, — — Marsh Cistus, or wild Rosemary.

Pyrola, — — Winter-Green.

Rhododendrum, — — Dwarf Rose bay.

Rhodora.

Royena, — — African Bladder-Nut.

SECTION V.

Plants with horned Anthers, and twelve or more Stamina.

(Dodecandria of Linnæus.)

Garcinia, — — Mangostan.

Halesia.

Styrax, — — Storax-Tree

SECTION VI.

Plants with horned Anthers, and many sets of united Stamina.
(Polyadelphia of Linnæus.)

Linnæan Genera. English Names.

Citrus, — — Citron, Orange, Lemon.

SECTION VII.

*Plants with horned Anthers, and Hermaphrodite Flowers, with
Flowers of either or both Sexes, on distinct Roots.*
(Polygamia Diœcia of Linnæus.)

Diospyros, — — Indian Date Plumb.

The appearance of horned *anthers*, which has given name to this order, is not very conspicuous, unless in the following genera: whortle-berries, heath, strawberry-tree, dwarf rose-bay, and trailing arbutus. The fifth and sixth sections seem to be improperly annexed to this order.

Habit and Structure of the Plants of this Natural Order.

The plants of this order are all of the shrub and tree kind.

The ROOTS are branched and fibrous.

The STEMS and branches cylindric.

The BUDS conic, sometimes covered with scales, as in the strawberry-tree; sometimes naked or without scales, as in storax.

The LEAVES are generally alternate; in heath, *rhododendron*, and some species of *kalmia*, they are opposite.

In most of the plants of this order, the leaves are either sessile, that is placed upon the branches without a foot-stalk, or supported by a very short foot-stalk, which is semi-cylindric, and flat above. In a species of *rhododendron*, called *dauricum*, the leaves are furnished with long foot-stalks.

The FLOWERS in this order are universally hermaphrodite, except in one genus, Indian date plumb, *diospyros*; where hermaphrodite and male flowers are produced in the same species, upon distinct roots.

The flowers proceed either solitary, or in a *corymbus*, from the angles formed by the leaves and branches; or hang
down

down in spikes and clusters, at the end of the branches; each flower having a small scale, or floral leaf, placed under it.

In most plants of this order, the calyx is placed around or below the germen. In the genera *vaccinium*, *styrax*, *halefia*, it is seated above the germen; a circumstance which essentially distinguishes those genera from all the plants of the family to which they belong.

The CALYX is universally a *perianthium*, and generally monophyllous or of one piece deeply divided into four or five segments, which are permanent, that is, accompany the germen to its maturity. The segments are often acute, and sometimes coloured. In heath, *erica*; and mangostan, *garcinia*; the flower-cup is composed of four distinct leaves.

Trailing arbutus, *epigaea*; and the genus *gaultheria*; have the appearance of a double calyx: the external consisting of three leaves in the former, of two in the latter; the internal being divided into five segments in both.

Some species of heath, *erica*, have likewise a double calyx.

The inner calyx in the genus *gaultheria* becomes pulpy like a berry, and in this form surrounds the seed-vessel, which is a *capsule*. *Vide CAPSULA*.

In the orange-tree, *citrus*, the calyx is *marcescent*, that is, withers without falling off.

The COROLLA, or coloured inner cover, is generally monopetalous, and bell or funnel-shaped; the figure, however, is not very constant, even in plants of the same genus, as is remarkably the case in heath *erica*; and the genus *andromeda*; which, in this and other circumstances, are so similar, as scarce to be distinguished but by the number of stamina.

The LIMB or upper part of the petal, is commonly divided into four or five segments, which are sometimes rolled back, as in *vaccinium*; sometimes bent inwards, as in *blaeria*.

The limb too is sometimes slightly cut, as in the genus *gaultheria*; sometimes divided almost to the bottom, as in trailing arbutus, *epigaea*; and the storax-tree, *styrax*.

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The **TUBE** or lower part of the petal, is cylindric, and generally of the same length with the calyx. In the dwarf laurel of America, *kalmia*, it is longer than the calyx. The tube in trailing arbutus, *epigaea*, is hairy within.

Dwarf laurel of America, *kalmia*; and the genus *gaultheria*, are furnished with a *nectarium* of ten pieces, which, in the former, is horn-shaped, prominent, and surrounds the limb of the corolla; in the latter, is placed round the *germen* or seed-bud, within the stamina. *Vide* NECTARIUM.

Marsh-cistus, *rhodora*, *clethra*, winter-green, *pyrola*; orange-tree, *citrus*; and *garcinia*; are polypetalous; that is, have a corolla composed of more pieces than one.

The number of **STAMINA** in this order is from four to twenty. These are generally erect, and attached to the lower part of the tube of the corolla. In *blaeria*, American upright honey-suckle, *azalea*; *gaultheria*, heath, *erica*; and Indian date plumb, *diospyros*, which are monopetalous; the stamina are inserted into the common receptacle.

Dwarf rose-bay, *rhodora*, and *gaultheria*, have declining stamina.

The **ANTHERS** or summits are bifid or forked below, and being slightly attached to the filaments, are frequently inverted in such manner as to exhibit an appearance like two horns at top. This appearance, however, as we observed above, is conspicuous in a few genera only.

In winter-green, *pyrola*; and heath, *erica*; the anthers are not inverted, being forked at top.

African bladder-nut, *royena*, according to Linnæus, has two anthers upon each filament: (*Vide* ANTHERA *Didyma*.) though I am apt to imagine he has mistaken the horns or forked summits of this genus, for two distinct anthers.

In whortle-berries, *vaccinium*, the back of the anthers is furnished with two spreading *aristæ* or beards.

The **GERMEN**, or seed-bud, in plants of this order, is generally roundish, and seated above the receptacle. In *rhododendron*, and *blaeria*, it is cornered. *Vaccinium*, *haleisia*, and *styrax*, have the germen below the receptacle.

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The **STYLE** is single, thread-shaped, of the same length with the corolla, and in a few genera permanent.

African bladder-nut, *royena*, has two styles; the genus *garcinia* scarce any; in *blaeria*, the style is much longer than the corolla.

The **STIGMA** or top of the style, is obtuse, and frequently entire.

In heath, the stigma is four cornered, and divided in four.

Trailing arbutus, mangostan, and the genus *rhodora*, have likewise a divided stigma.

The **SEED-VESSEL** is either a *capsule* with five cells, as in *kalmia*; a roundish *berry* with divisions of the same kind, as in the strawberry-tree: or an oblong four-cornered *nut* with two cells, as in *halefia*.

The **SEEDS** are numerous, frequently hard, or bony, generally roundish, sometimes cornered.

The plants of this order are astringent; particularly heath, winter-green, whortle-berries, and uva ursi, (*arbutus*.)

The berries of the Indian date plumb, *arbutus*, and *vacinium*, are acid and esculent.

From the storax-tree is drawn, by incision, a fragrant, resinous gum, which is much used in medicine, particularly for coughs, catarrhs, and internal ulcers.

The leaves of winter-green, (*pyrola*,) says Lemery, are used internally, either in infusion, or powder, for the hæmorrhoids, inflammations of the breast, and fluxes of the lower belly: externally in plaisters and ointment, for stopping blood, and drying up wounds.

The flowers of the Azalea tribe bear a striking resemblance to those of honey-suckle, whence the name of American upright honey-suckle, by which the Virginian species are distinguished. From the clamminess of the flowers of one of these species, hence termed *azalea viscosa*, and by Catesby, *Cistus Virginiana, flore et odore periclymeni*, it seems highly probable, that the plant possesses balsamic virtues, which, if particularly investigated, might render it of sovereign use in medicine.

From the dried peel of the fruit of the Japanese Citron,
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the *citrus trifoliata* of Linnæus, cut into small pieces, is prepared, with the addition of some other ingredients, a celebrated medicine known in Japan by the name of Ki-ko-ke; by which name the fruit itself is known among the vulgar. It is a thorny shrub, the trunk of which, says Kempfer, by age and culture, acquires the thickness of a tree. The leaves grow by threes like those of trefoil, upon the extremity of a common foot-stalk: and to the white flowers, which resemble those of medlar, succeeds a fruit, which in external beauty differs nothing from a middle-sized orange, the internal structure of which it likewise resembles, except that the pulp, which is contained in a cavity having seven partitions, is glutinous, of an unpleasant smell, and harsh disagreeable taste. The seeds are exactly like those of the orange, and have the same taste with the pulp. See *Kempferi Amœnit. Exoticæ.* p. 801.

BICORNES, is likewise the name of the forty-fourth class or natural order, in Lud. Gerard's Arrangement of the Plants that are natives of Provence in France; consisting, like the same order in Linnæus, of plants whose anthers have the appearance of two horns. The genera described by Gerard are,—*vaccinium, erica, azalea, rhododendron, arbutus, styrax, pyrola*, and *hedera*, (ivy.) The last mentioned genus, though its anthers are bifid at the base, does not belong to Linnæus's class *Bicornes*; but is placed with the vine, and some other genera of plants, in the order *hederaceæ.* Vide *HEDERACEÆ.*

BIFERÆ *Plantæ*, (from *bis*, twice, and *fero*, to bear); plants that flower twice a year, in spring and autumn, as is common between the tropics. Vide *Phil. Bot.* p. 277.

BIFORA *Pericarpia*, (from *bis*, twice; and *fores*, a door); the name of a class in Camellus's Method, consisting of plants whose *pericarpium* or seed-vessel, is furnished with two inelofures, termed *valvules.* Vide *VALVULA.*

It is exemplified in celandine, *chelidonium.*

BILOCULARES, (from *bis*, twice, and *loculus*, a little cell); the name of the thirtieth class or family, in Lud. Gerard's Arrangement of the Plants that are natives of Provence

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vence in France; consisting of these genera; jessamine, *jasminum*; privet, *ligustrum*; the olive, *olea*; speedwell, *veronica*; mock-privet, *phillyrea*; and the ash-tree, *fraxinus*.

The title of this order would seem to import, that the several genera in question were furnished with a seed-vessel divided into two *loculi* or cells; yet, in fact, there are but two genera, jessamine, and speedwell, that answer this description; the rest having either a seed-vessel furnished with one cell only, as the olive, privet, and mock-privet; or no seed-vessel at all, except the crust or tough covering of the seed, as the ash-tree. The plants of this natural family make part of the order *Sepiariæ* of Linnæus; and, except the ash-tree, are all reduced to the class *Diandria*, in the Sexual System. *Vide* SEPIARIÆ, and DIANDRIA.

BIVASCULARES *Herbæ*, (from *bis*, twice, and *vasculum*, a little vessel); the name of the 9th class in Hermannus's Method, consisting of herbaceous vegetables, which have a single *capsule*, (*Vide* CAPSULA,) or hollow seed-vessel, divided into two *loculi* or cells. *Vide* LOCUMENTA.

To this class belong thorn apple, *datura*; mullein, *verbascum*; the tobacco plant, *nicotiana*; water-purslane, *peplis*; limeum, *roella*, *galenia*, *weinmannia*, *cunonia*, *hydrangea*, *heliocarpus*, *curatella*, and many others.

Note, the term *bivascularis* is synonymous to *bilocularis*, in Linnæus.

BRACHIUM, and **BRACHIALIS** *Mensura*, the arm; a term of measure. *Vide* MENSURA.

BRACTEA, (properly a thin leaf or plate of gold, silver, or other metal,) a floral leaf; the name of one of the seven *fulcra* or *props* of plants, enumerated by Linnæus, in his *Delineatio Plantæ*, and *Philosophia Botanica*.

The invention of this term, though claimed by Linnæus, is due to Jungius, who uses it for the *corolla* of modern botanists, including under that name both petals and *nectarium*. *Vide* COROLLA, PETALUM, and NECTARIUM.

In fact, of the numerous terms with which the great reformer of botanical language pretends to have enriched the science, there

there are very few that have not been used, either in the same, or a different sense, by former writers. Thus, *spatha* is as old as Theophrastus; *germen*, which Linnæus applies to the seed-bud, is used by Pliny for the buds of the leaves: *involucrum*, is a term of Artedi; *legumen*, *cyma*, and *glandula*, are of great antiquity: *drupa* is to be found in Kyber's Lexicon, published at Strasbourg, in 8vo. 1553. The terms *arillus*, and *bractea*, are very improper: nor can much be said in favour of *scapus* and *pedunculus*. In short, of the sixteen terms enumerated by Linnæus, as new and necessary, there are but five in reality such; viz. *corolla*, *anthera*, *pollen*, *stigma*, and *stipula*. But this by the way.

The BRACTEÆ, or floral leaves, differ in size, shape, and colour, from the other leaves of the plant. They are situated on the flower-stalks, and often so near the fructification, as to be confounded with the calyx. Examples of the floral-leaf may be seen in the lime-tree, *tilia*; cow-wheat, *melampyrum*; sage, lavender, *bartsia*, some species of fumatory, *nussaenda*, *hebenstretia*, *monarda*, hellebore, fennel-flower, *nigella*; passion-flower, *passiflora*; wild Syrian rue, *peganum*; bird's-foot, *ornithopus*; some species of French honey-suckle, *hedysarum*; African-broom, *aspalathus*; milk-wort, *polygala*; rest-harrow, *ononis*; lady's-finger, *anthyllis*; kidney-bean, *phaseolus*; base tree-trefoil, *cytissus*; Carolina kidney-bean tree, *glycine*; bird's-foot trefoil, *lotus*; indigo, dragon's-head, *dracocephalum*; and many others:

The floral-leaf is commonly of the same duration with the ordinary leaves of the plant; a circumstance by which, in doubtful cases, it will be distinguished, with great accuracy, from the calyx or flower-cup, which always withers when the fruit is ripe, if not before.

Without attending to this observation, we might be apt to commit mistakes, in ascertaining several genera of plants; as hellebore, fennel-flower, passion-flower, and others, which have *bractea*, but want the calyx.

In point of SIZE and HEIGHT, floral leaves are shorter than the flower-cup in snap-tree, *justicia hyssopifolia*, and
ruellia

ruellia ringens : longer than the flower-cup in common clary, *salvia sclarea*; *ruellia repens*, and *stipa spinifex* : larger than the flower-cup, and placed under it, in *royena villosa* : shorter than the flower in spotted clary with a sage leaf, *salvia sylvestris*; *fumaria nobilis*, and *minuartia campestris* : of equal length with the flower, in greater bulbous fumatory with a hollow root, *fumaria bulbosa*; *hypoxis erecta*, and *ornithogalum comosum* : and longer than the flower in sweet alpine currant, *ribes alpina*; and *minuartia montana*. *Cunila pulegioides*, besides a number of smaller ones, has two floral leaves larger than the flower, placed on each side of the foot-stalk.

In respect to NUMBER, plants have either one floral leaf : as viscous field gum succory with rushy stalks, *chondrilla juncea*; *aristolochia pistolochia*, and *andromeda daboecia* : two, as *campanula alpina*, *commelina zanonina*, wild-briar, *rosa canina*; *royena villosa*, *ruellia ringens*, *cineraria sibirica*, and *hypoxis erecta* : three, as *erica calycina*, and distaff-thistle with a bellied netted involucre, *atractylis cancellata* : four or five, as *corymbium scabrum* : or several, as *cunila pulegioides*, *stipa spinifex*, and many others.

The *bracteæ*, in black-berried upright honey-suckle, (*lonicera nigra*), are composed of two dry scales, and three broad lesser leaves.

In crown imperial, lavender, some species of sage; *salvia*; and a few other plants, the flower-stem is terminated with a number of very large *bracteæ*, which, from their resemblance to a bush of hair, are denominated *coma*, and *bracteæ comosæ*. Vide COMA.

Floral-leaves, particularly those of the bushy kind just mentioned, afford excellent marks of distinction in determining the species; on which account they merit the careful attention of every botanist.

BRACTEATÆ, (from *bractea*). The twenty-eighth class in Boerhaave's Method, consisting of herbaceous vegetables, which have petals, and whose seeds are furnished with a single *cotyledon*, or lobe. Vide COTYLEDONES.

The term *bractea*, from which the name of this class is manifestly

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manifestly derived, is used by Boerhaave, after Jungius, for the *corolla* of modern botanists. *Vide* BRACTEA.

This class stands opposed to the twenty-ninth class, *apetalæ monocotyledones*, of the same author, and is exemplified in the grasses.

BRUMALES *Plantæ*, (from *bruma*, winter); plants which flower in our winter; common about the Cape. *Vide Phil. Bot.* p. 276.

BULBOSÆ, (from *bulbus*); the name of the ninth class in Cæsalpinus's Systematic Method, consisting of herbaceous vegetables, which have a bulbous root, and a *pericarpium* or seed-vessel, divided into three cells. *Vide* BULBUS.

The tulip, onion, and lilly, furnish examples.

Bulbosæ, and *bulbosis affines*, are likewise the names of the twenty-fourth and twenty-fifth classes, in Ray's *Methodus Propria*, published in the *Philosophia Botanica*, p. 21.

BULBUS, (Gr. *Βολβος*, *Bulbus*, *radix quævis rotunda*,) a bulb; a kind of large bud, generally produced under the ground, upon or near the root of certain herbaceous plants, hence denominated bulbous.

A bulb is defined by Linnæus to be a species of *hybernaculum*, produced upon the descending *caudex* or root, consisting of *stipulæ*, *petioli*, the rudiments of the former leaves, and scales of the bark. *Vide* HYBERNACULUM, and CAUDEX.

The obscurity of this definition, and the great confusion in botanical terms thence arising, render it necessary for me to give a more accurate and precise idea of the term in question.

For this purpose, I would previously remark that every bud contains in miniature or embryo, a plant, in every respect similar to the parent plant upon which it is seated. Plants, therefore, are perpetuated in the buds, as well as in the seeds; and the species may be renewed, with equal efficacy, in either way.

The tender rudiments of the future vegetable, of which the bud is composed, are inclosed, and, during the severities of winter, defended from cold and other external injuries,

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juries, by a hard bark, or rind, which generally consists of a number of scales, placed over each other like tiles, and fastened together, by means of a tenacious, resinous, and frequently odoriferous substance. Thus defended, the buds remain upon different parts of the mother-plant, till the ensuing spring; and are, therefore, with great propriety, denominated by Linnæus, the *hybernaculum*, or winter-quarters of the future vegetable.

With respect to their place, buds are seated either upon the stem and branches, or upon the roots: the former are stiled *gemmae*, or buds properly so called; the latter bulbs, and suckers; *bulbi* & *turiones*; in French, *oignons* & *cayeux*. Vide GEMMA.

Annual plants, which perform the changes of vegetation but once, can have neither buds, nor bulbs; and are only preserved in the seeds.

Herbaceous perennials, which lose their stems during the winter, can have no *gemmae*, or buds properly so called; but as they subsist several years by their roots, may be furnished with the other species of *hybernaculum*, called bulbs, which, according to the definition, are seated upon the descending *caudex* of the root.

Again, trees which are perennial, with a woody and durable stem or trunk, have generally *proper* buds, or *gemmae*, but no bulbs.

In bulbous plants, as the tulip, onion, and lily, what we ignorantly call the root, is, in fact, a bulb, or *hybernaculum*, which encloses and secures the embryo, or future shoot.

At the lower part of this bulb, may be observed a fleshy knob, or tubercle, from which proceed a number of fibres, or threads. This knob, with the fibres attached to and hanging from it, is, properly speaking, the true root; the upper part being only the cradle, or nursery of the future stem, which after the bulb has repaired a certain number of times, it perishes; but not till it has produced, at its sides, a number of smaller bulbs, termed *turiones*, or *suckers*, for perpetuating the species.

One part of Linnæus's Definition still remains obscure. The bulb, says he, is composed of the remains or rudiments of the former leaves of the plant, *è rudimento foliorum præteritorum*.

It is easy to comprehend, that buds contain the rudiments of the future leaves; but how can bulbs be said to contain the rudiments of leaves, which, to all appearance, are already perished?

To explain this, let it be observed, that, in the opinion of eminent botanists, the root, in a very great number of perennial herbs, is annually renewed, or repaired out of the trunk, or stalk itself; in which sense only, roots are properly said to descend.

In the perennials alluded to, the basis of the stalk continually, and by insensible degrees, descends below the surface of the earth, and is thus changed into a true root; which root, by the continuance of the said motion of the stalk, also descends; and thus, according to the durableness of its substance, becomes a shorter, or longer root: the elder, or lower part rotting off in proportion as the upper is generated out of the stalk. Thus in brownwort, the basis of the stalk, sinking down by degrees, till it is hid under ground, becomes the upper part of the root; and continuing still to sink the next year, becomes the lower part, and the following year rots away.

This is exactly what obtains in bulbous roots, as well as in the far greater number of other herbaceous perennials: as arum, valerian, tanzy, brownwort, samphire, primrose, wood sorrel, iris, and others.

The immediate visible cause of this descent, is the string-roots, which this kind of trunks frequently puts forth; which descending themselves directly into the ground, serve, like so many ropes, for pulling the trunk after them. Hence the tuberous roots of iris are sometimes observed to re-ascend a little, upon the rotting, or fading away of the string-roots which hang at them.

In bulbous roots, where the stalk and former leaves of the plant are sunk below, and formed into what is called the bulb,

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bulb, or wintering of the future vegetable, the radicles, or small fibres that hang from the bulb, are to be considered as the root, that is, the part which furnishes nourishment to the plant : the several rinds and shells whereof chiefly the bulb consists, successively perish, and shrink up into so many dry skins, betwixt which, and in their center, are formed other leaves and shells ; and thus the bulb is perpetuated.

What has been said of the descent of roots, by the sinking of the stalk, is further confirmed by the appearance of certain roots ; as of valerian, *plantago major*, and devil's bit, (*scabiosa succisa*,) in which the lower part appears bitten, or chopped off. In these, the lower part rotting off, as the upper descends, the living remainder becomes stumped, or seems bitten.

All bulbous roots, says the learned Dr. Grew, in his *Anatomy of Plants*, may be considered as hermaphrodite roots, or root and trunk both together ; for the radicles, or strings only, are absolute roots : the bulb actually containing those parts which, springing up, make the leaves, or body of the plant ; so that it may be regarded as a great bud underground.

We enlarged above, upon the descent of roots, by the sinking of the stalk, or trunk ; and gave evidences of the reality of such an appearance. I shall only add to what was then observed, another demonstration of the same appearance from the root of a species of *iris*, called by Grew, *iris tuberosa* ; in which, although the leaves fall off, close to the surface of the stalk, yet after that is sunk down, and swelled into a root, the seats of the perished leaves, and the ends of the vessels belonging to them, become visible : the whole surface of the root appears covered with seams and pricked lines ; the former exhibiting the seats of the leaves ; the latter, the terminations or broken ends of the vessels ; which ends are still more apparent, upon stripping off the bark.

The descent, or sinking of the stalk, may also be gathered from the similar position and structure of the vessels, in the root and trunk of certain plants. In short, as among animals, there are many which are not bred of eggs immediately, but

transformed, one into another, as in the case of many insects: so it is probable, that, among plants, there are not a few instances of the like transformation, whereof this is one.

From what has been said, we may clearly understand in what particular way some roots become perennial. Those of trees, shrubs, and divers other woody plants, are wholly perennial; others are only so in part, or by means of a new *progenies* of roots, proceeding from the old head, or body, in the room of those that die yearly, or after a certain time; as the roots of the potatoe, Jerusalem-artichoke, monkshood, and others. In like manner, string-roots, or fibrous roots, succeed one another annually: so that, at the end of many years, what is still looked upon as the same individual root, is, in reality, another, as to every particle thereof.

Of bulbs, there are generally reckoned five species, or kinds.

BULBUS SQUAMATUS, or **SQUAMOSUS**, a scaly bulb, consisting of thin plates, or scales, laid over one another like tiles, (*lamellæ imbricatæ*); as in the lilly.

BULBUS ARTICULATUS, a jointed bulb, composed of several *lamellæ* or plates, that are closely linked together; as in *lathræa*, *adoxa*, and *martynia*.

BULBUS DUPLICATUS, consisting of two solid bulbs connected together; as in *fritillaria*, and some species of *orchis*. This kind of bulbous root is also called *testiculata*, from its fancied resemblance to a pair of testicles.

BULBUS SOLIDUS, a solid bulb; composed of an entire fleshy substance; as in the tulip.

BULBUS TUNICATUS, a coated bulb; consisting of several tunics or coats, closely embracing, or infolding each other; as in the onion, *cepa*. This species of bulb stands opposed to the former, which is of a solid substance, that is, has no divisions, or coats.

The coats in question are sometimes very thick, and so succulent, that they suffice to make the plant vegetate, without the assistance of earth and water. This is what happens in the officinal plant, *scilla maritima*, or sea-onion; the coated bulbs of which put out their stems, and produce flowers,

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flowers, without being planted in earth, as they lie in the druggists shops. The vessels, with which these coats are probably furnished, absorb the humidity from the air, and thus perform the office of the small fibres of the root.

To the five species of bulbs, already enumerated, may be added a sixth sort,

BULBUS CAULINUS, a bulb seated upon the stem or stalk, in opposition to all the former species, which are placed immediately upon the root. Of these stem-bulbs, we shall speak more at large below.

It was observed in the definition, that bulbs are frequently produced near the root of certain plants. Such are the small bulbs, called suckers; the *soboles*, and *turiones*, of some writers; the *adnata*, and *adnascentia bulbi*, of others. These suckers, or off-sets, which frequently come up with surprising rapidity, are produced from the sides of the old, or parent bulb, to which they are closely connected. Examples may be seen in the narcissus, amaryllis, sea-daffodil, *pancratium*, and several others.

Suckers serve instead of buds to bulbous plants; they renew the species, and, in some measure, replace the individual, by developing, or unfolding the plant which they contain in miniature.

This plant, although not visible by the naked eye, in the sucker, may be distinctly perceived, in the month of January, with the assistance of a good glass, in the center of the bulb.

Suckers begin to be formed on the bulbs, when the stalk and other adhering parts are supplied with little or no juice from the root; that is, when the plant begins to wither and fade. This, in our climate, happens in autumn; at which time, under-shrubs, and perennial herbs, collect on their roots new strength, for the vegetation of the ensuing year.

Thus we have seen, that suckers, as well as buds, contain the rudiments of a præ-existing plant; that their nourishment is transmitted by the parent-bulb, and that this nourishment develops and unfolds their parts, by assimilating to their substance the nutritive juices. Thus unfolded,

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the sucker produces an individual; forms news suckers, which, in their turn, produce others; and in this manner multiply the species, as certainly as the seed.

The terms *scaly*, *jointed*, *solid*, and *coated*, are applicable to suckers, as well as bulbs. *Vide supra*.

Many plants form productions, which may be compared to *suckers*, although they are not, like them, placed near the root. Such are the stem-bulbs mentioned above, which, in different plants, are disposed in different parts of the stalk, or stem.

In tooth-wort, *dentaria*; saxifrage; bistort; *dioscorea*; star of Bethlehem, *ornithogalum*; fiery-lily, *lilium humile*; and some other liliaceous plants, the stalks put out bulbs from the wings of the leaves; which, if taken off, when the stalks decay, and planted, will quickly take root, and vegetate. Productions of the same sort are observed in most of the *lichens*, with this difference, that in these they are seated without the wings of the leaves, *e axilla foliorum*. *Vide* AXILLA.

Such productions in imperfect plants of this kind, are not to be ascribed, says a French writer, to any species of generation; they are detached portions of their own proper substance, which, by a simple extension, and without any regular developement, as in the case of germinating from a seed, or bud, become, as they enlarge, perfectly similar to the mother-plant.

In some species of garlick, hence denominated *bulbiferous*, bulbs are produced at the origin of the umbel of flowers, between the *pedunculi*, or foot-stalks. *Vide* UMBELLA and PEDUNCULUS. These small bulbs are sometimes among gardeners, known by the name of *cloves*.

An appearance of the same kind is observed in the flowers of two or three species of *poa*, hence styled *viviparous*; and in the fruit of a plant of Senegal, called by M. Adanson, *tangekolli*; the seeds of which germinate, and form bulbs or suckers, *cayeux*, even before the capsule which contains them has arrived at maturity.

To the head of stem-bulbs may be likewise referred the
fleshy

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fleshy succulent leaves of several liliaceous plants; as the aloe, and sea-onion, *scilla*; and of some species of *arum*; which being planted in the ground, take root, and vegetate.

Bulbs often afford a real specific difference, and are sometimes the sole distinction; as in the sea-onion, *scilla*; where the species are scarce to be distinguished, but by the difference of the bulbs, which are either *coated*, *solid*, or *scaly*. *Vide supra*.

By their situation in the wings of the leaves, and on different parts of the stalk, stem-bulbs furnish essential marks in that of Bethlehem, tooth-wort, saxifrage, bistort, lily, a few species of garlick, and some other plants.

In drying bulbous plants for use, it is necessary to strip off the leaves, and expose the roots to a sand heat.

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CADUCI, (from *cadō*, to fall); the name of a class in Linnæus's *Methodus Calycina*, consisting of plants whose calyx is a simple *perianthium*, supporting a single flower, or fructification, and falling off either before or with the petals. It stands opposed to the classes *persistentes* in the same method, and is exemplified in mustard, *sinapi*; and ranunculus,

The term caducous in Botany, is expressive of the shortest period of duration, and has different acceptations, according to the different parts of the plant to which it is applied. A calyx is said to be caducous, which drops at the first opening of the petals, or even before, as in poppy, *papaver*, and barren-wort, *epimedium*. Petals are caducous, which are scarce unfolded before they fall off, as in meadow-rue, (*thalictrum*); and such leaves have obtained this denomination as fall before the end of summer.

From this definition of the term *caducus*, it evidently appears that the above-mentioned class in Linnæus's *Methodus Calycina*, includes not only such plants as have a caducous

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calyx properly so called, but those likewise in which the calyx is deciduous, that is, falls off either before or with the petals. *Vide* DECIDUUS and PERSISTENS.

CALAMARIÆ, (from *calamus*, a reed); the name of the third order in Linnæus's Fragments of a Natural Method. This order will be easily distinguished from the family of the grasses, to which it is nearly allied, by attending to the following particulars. *Vide* GRAMINA.

1. The base of the leaf, which embraces the stalk like a glove, has no longitudinal aperture in plants of this order, but is perfectly entire.

2. The stalk is generally triangular, and without knots, or joints.

3. The flowers have no petals.

List of the Genera contained in this Natural Order.

S E C T I O N I.

Hermaphrodite Plants.

Linnæan Genera.	English Names.
<i>Cyperus</i> , —	— Cypress Grass.
<i>Eriophorum</i> , —	— Cotton Grass.
<i>Schæmus</i> , —	— Bastard Cypress.
<i>Scirpus</i> , —	— Rush Grass.

S E C T I O N II.

Androgynous Plants. (Monoecia.)

<i>Carex</i> .	
<i>Sparganium</i> , —	— Burr-Reed.
<i>Typha</i> , —	— Cat's-Tail, or Reed-Mace.

In the former editions of the Fragments, the genera *Bor-
bartia*, *Flagellaria*, and *Juncus*, made part of this order;
they are now very improperly removed into the order *Tri-
petaloides*, which see.

Habit

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Habit and Structure of the Plants of the Order Calamarizæ.

In some plants of this natural order, the **ROOTS** are long and knotty; in others they are composed of fleshy fibres, which pierce deep into the ground; and in others of a bulb.

The **STALKS** are three-cornered, straight, and have no knots, or joints.

The **LEAVES** are long, grassy, frequently three-cornered, and have no *petiolus*, or foot-stalk, except the base of the leaf, which entirely embraces the stem, without any longitudinal aperture, as in the grasses.

The membrane, and two lateral wings likewise, which crown the base of the leaf in most of the grasses, are generally wanting in the plants of this natural order.

Exception. The genus *carex* is furnished with a short membrane of this kind.

The **FLOWERS** are either hermaphrodite, as in the first section: or male and female upon the same root, as in the second.

Note.—The female flowers, in some species of *carex*, are produced upon distinct roots from the male.

The mode of inflorescence in this order, is generally a **SPIKE**; *Vide SPICA*. sometimes a **CAPITULUM**, or head, as in burr-reed. *Vide CAPITULUM*.

The **CALYX**, in plants of the first section, is a *gluma*, or scaly husk; in those of the second, an *amentum*, or catkin. *Vide GLUMA*, and **AMENTUM**.

The former species of calyx supports a single flower in cypress-grass, rush-grass, and *eriophorum*: the latter in *carex*.

In ballard-cypress; burr-reed, *sparganium*; and cat's-tail, *typha*; the calyx is common to many flowers.

Some species of cypress-grass, says a French writer, have two abortive, or imperfect flowers, at the bottom of each spike; the scales of which resemble the common husk or calyx, which is generally seated under the grasses. By a similar abortion, continues the same author, the genus *schœnus* appears to have a common calyx, consisting of several scales; whereas, in fact, of the six flowers which compose each

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each spike, the four lowest proving abortive, leave void the spaces between their respective scales: so that the calyx of this plant has been erroneously supposed to consist of six or more scales, formed into a common *gluma*, or husk.

The COROLLA, in plants of this order, is wanting.

Exception. The female flowers of the genus *carex* are furnished with a *nectarium*, of an oblong figure, swelled out like a bladder, contracted above, gaping at the top, bifid, and permanent; the male flowers have neither petals nor *nectarium*.

The genus *schænus*, according to Linnæus, has six lance-shaped, acute, and permanent petals.

The FILAMENTS of the STAMINA are three in number, short, slender like a hair, and sometimes bristly.

Some species of cypress, and rush-grafs, have only two stamina; and Mr. Adanson mentions a species of the latter, a native of Senegal, which never produces above one stamen.

The ANTHERS, or summits, are generally long, slender, and erect.

In cat's-tail, *typha*, the summits are oblong, and hang down, (*antheræ pendulæ*.)

The SEED-BUD is very small, blunt, and sometimes three-cornered, as in the *carex*, where it is placed within the *nectarium*.

The STYLE is thread-shaped, and of the length of the scaly calyx. In cypress-grafs, the style is very long: in *carex*, very short.

The summits of the style, *stigmata*, are generally three in number, slender, hairy, and sometimes permanent.

Note.—Cat's-tail has but one *stigma*; burr-reed, and some species of cypress-grafs, but two: in a species of rush-grafs, Sceuchzerus observed four.

Each flower, in plants of this order, is furnished with a single seed, which is generally hairy, three cornered, and without any *pericarpium*, or vessel.

Note.—In such as have only a single or double *stigma*, the seeds are not cornered, but oval, or flat.

The *nectarium*, in the genus *carex*, by cherishing the seed within

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within its bosom, serves instead of a *pericarpium*, or fruit-vessel.

The virtues, uses, and sensible qualities of this order of plants, are the same as those of the grasses to which it has been always joined by former botanical writers. *Vide GRAMINA.*

The roots of the round and long cypress-grass, were formerly much used in medicine. The long is of our own growth, though not very common; the round we have from the East-Indies. The former, which is properly the *cyperus* of the shops, and is called by Tournefort, sweet-scented *cyperus* with a long root, grows by rivulets, and other watery places, as ditches, and the like. The root is knotty, wrapped round with fibrous strings, not easy to break, of a brown colour without, and grey within; of a pleasant scent, especially when fresh, and well dried; the leaves are green, and resemble those of the reed and leek. The latter, sometimes called English, or Flemish cypress, grows in the water, and along banks and river sides. Its root is as thick as an olive, full of little knots, or specks, of an oblong figure, grey colour, sweet and somewhat sharp taste, and almost without smell, when it is newly taken out of the ground.

The roots of both plants are esteemed cordial, diuretick, and cephalick, resisters of poisons, and expellers of wind. Long cypress is much used by perfumers, and glovers.

Fragrant rush, or camel's hay, which I take to be a species of *schænus*, is a kind of reed, or grass, which grows plentifully in Arabia Felix, and at the foot of Mount Libanus, where it serves the people for forage and litter for their camels. The plant is about a foot high, with a small, hard, dry, knotty root, from which proceed several hard stalks, of the size, figure, and colour of a barley-straw. The leaves are about half a foot long, narrow, rough, pointed, and of a pale green colour. The flowers are small, hairy, of a carnation colour, agreeable to the eye, and of a warm, biting, aromack taste. All the plant, but especially the flower, is used in medicine. It is reckoned attenuating, deterfive, diuretic,

diuretic, and vulnerary: but its principal use, at present, is as an ingredient in the Venice treacle.

Long-rooted bastard cypress, the *schænus mariscus* of Linnæus, serves, in Gothland and other parts of Sweden, for thatching, instead of straw, and often grows in such quantities in pools, as to form floating islands. *Vide LINNÆI ITER GOTLANDICUM.*

It is observed by Pennant, in his *Tour to the Hebrides*, that, in the Isle of Sky, many-headed cotton-grass (*erriophorum polystachion*,) is used by the inhabitants to support their cattle in the earlier part of the spring, before the other grasses are sufficiently grown. The poorer sort, in Sweden, stuff their pillows with the down, cotton, or wool, which surrounds the seeds, and gives name to the genus; of which likewise they make wicks of candles: but for this purpose it is the less proper, as being apt to become brittle when dry.

The Laplanders, says Linnæus, in his *Flora Lapponica*, put the dried and carded leaves of the bladder-carex (*carex vesicaria*) into their shoes, to repel the cold in winter, and in the heats of summer, to prevent excessive perspiration. In Italy and Germany, observes Micheli, in his *Nova Genera Plantarum*, the leaves of the same species of *carex* are used by different artificers, as glass-makers and saddlers, for various purposes, but especially by coopers, for stopping the chinks, and closing the joinings of their casks.

With bull-rush *scirpus*, the *scirpus lacustris* of Linnæus, cottages are thatched, pack-saddles stuffed, and, in want of more substantial nourishment, cattle are sometimes fed with it. *Lin. Flor. Succ.* p. 16. Mats, and bottoms of chairs too, are very commonly made of this rush. If cut at one year old, it makes the fine bottoms; coarse bottoms are made of it at two years old; and those that are still older, mixed with the leaves of the yellow flag, (*Iris pseud-acorus*), make the coarsest bottoms of all. *Withering*, vol. 1.

CALCAR *Corollæ*, the spur of the corolla. The *nectarium* so called, which terminates the corolla behind, like a cock's

cock's-spur, in calve's-snout; valerian; orchis; violet; balsam, *impatiens*; lark-spur, *delphinium*; fumatory; butter-wort, *pinguicula*; and water-milfoil, *utricularia*. *Vide* NECTARIUM, and *Phil. Bot.* p. 73.

CALENDARIUM *Floræ*, a calendar; containing an exact register of the respective times, in which the plants of any given province, or climate, germinate, expand, and shed their leaves and flowers, and ripen and disperse their seeds. *Vide Phil. Bot.* p. 276.

For particulars, on this curious subject, we refer the reader to the articles DEFOLIATIO, EFFLORESCENTIA, FRONDESCENTIA, FRUCTESCENTIA, and GERMINATIO.

CALIDÆ *Plantæ*, (from *calor*, heat); plants that are natives of warm climates. Such are those of the East-Indies, South-America, Egypt, and the Canary islands.

These plants, says Linnæus, will bear a degree of heat, which is as 40, on a scale, in which 0 is the freezing point, and 100 the heat of boiling-water. In the 10th degree of cold, they cease to grow, lose their leaves, become barren, are suffocated, and perish. *Vide Phil. Bot.* p. 277.

CALOR, *heat*. In assimilating the vegetable with the animal kingdom, Linnæus terms heat the *heart* of Plants, *cor plantarum*. *Vide Phil. Bot.* p. 93.

“*Cor plantis nullum, sed calor efficit omne: nec opus est corde, ubi nec perpetui mobilis effectus necessarius est, & ubi propulsio, non circulatio humorum.*”

CALYCANTHEMÆ, (from calyx, the flower-cup; and *ανθος*, the flower); the name of the seventeenth order, in Linnæus's Fragments of a Natural Method, consisting of plants, which, among other characters, have the corolla and stamina inserted into the calyx.

List of Genera contained in this Natural Order.

S E C T I O N I.

Plants having the Receptacle of the Flower, placed upon the fruit.

Linnæan Genera.

English Names.

Epilobium, — — Willow-Herb, or French Willow.

Gaura,

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Linnæan Genera.		English Names.
<i>Gaura</i> ,	—	—, Virginian loose-strife.
<i>Isnardia</i> .		
<i>Jussiaea</i> .		
<i>Ludvigia</i> .		
<i>Melastoma</i> ,	—	— American Gooseberry-tree.
<i>Mentzelia</i> .		
<i>Oenothera</i> ,	—	— Tree Primrose.

S E C T I O N II.

Plants having the fruit (Germen) placed upon the Receptacle of the Flower.

<i>Anumannia</i> .		
<i>Frankenia</i> .		
<i>Glaux</i> ,	—	— Sea-chickweed, or Milk-wort, and Black Salt-wort.
<i>Grislea</i> .		
<i>Lythrum</i> ,	—	— Willow-Herb, or Purple loose strife.
<i>Osbeckia</i> .		
<i>Peplis</i> ,	—	— Water Purslane.
<i>Rhexia</i> .		

Habit and Structure of the Plants of the Order Calycanthemæ.

This order furnishes trees, shrubs, and annual, biennial and perennial herbs. The herbaceous annuals are by much the most numerous.

The **ROOTS** are branched and fibrous.

The **STEMS** and **BRANCHES**, cylindric.

In plants of the last section, the branches are generally opposite; in those of the first, alternate.

They are square, or four-cornered, when young, in both.

Note.—Such genera of the first section as have opposite leaves, have likewise opposite branches.

The **BUDS** are of a conic form, and without scales.

The **LEAVES**, in plants of the first section, are generally alternate, simple, and attached to the branches by a short foot-stalk. In American gooseberry-tree, they are opposite: and in French-willow, *epilobium*, opposite and alternate upon the same branch.

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In all the plants of the last section, the leaves are opposite at the bottom of the stem; and in some, alternate towards the top. They are universally sessile; that is, attached to the branches without any foot-stalk.

The MARGIN of the leaves in tree-primrose, *œnothera*; sea-milkwort, *glaux*; and French-willow, instead of indentments, has a number of small grains, or white tubercles, which are not perceptible, without close examination.

At the origin of the foot-stalk of the leaves, in *ludvigia*, *jussiaea*, and some other genera of the first section, are discovered two small scales in the form of *Stipulæ*, attached to the young branches.

The FLOWERS are universally hermaphrodite; growing opposite in such as have the leaves opposite, from the wings of which they generally proceed.

In French willow, the flowers are attached to the foot-stalk of the leaves, as they are likewise in *turnera*, and a species of *althæa frutex*, *hibiscus*; which do not belong to this natural family.—The modes of inflorescence in this order of plants, are a *spike*, *corymbus*, and *racemus*. Vide SPICA, &c.

The CALYX is universally a *perianthium*, and generally monophyllous, that is, composed of one leaf.

In French-willow, it consists of four distinct leaves; and in *mentzelia*, of five.

The segments, *lacinia*, of the limb, or upper part of the calyx, are different in point of number and division. In *osbeckia*; tree-primrose, *œnothera*; Virginian loose-strife, and *ludvigia*, it is deeply divided; in *rhæxia*, *isnardia*, and *grislea*, more slightly cut, into four: in *frankenian*, and American goose-berry tree, it is marked with five indentments, or teeth; in *ammannia*, with eight; in water-purflane, and purple loose-strife, with twelve.

The calyx, in plants of the first section, is placed upon the germen, or seed bud; the upper part falls off with the petals; the lower is permanent, and in fact, continuous with the *germen*.

In plants of the second section, the calyx is permanent,
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mouth of a deep black, that the generical name *Melastoma*, that is, black mouth, is derived.

CALYCIFLORÆ, (from *calyx*, the flower-cup, and *flos*, the flower); the sixteenth order in Linnæus's Fragments of a Natural Method, consisting of plants which, as the title imports, have the stamina (the flower) inserted into the calyx.

This order differs from the former, which has a title of the same import, in the following particulars.

1. The plants of this order want the corolla.
2. With respect to their sex, the flowers are either hermaphrodite and male upon the same root, *polygamia*; or male and female upon different roots.
3. The seed-vessel is pulpy, of the berry, or cherry-kind, and contains a single seed or stone.

The Order Calycifloræ contains but four Genera: viz.

Linnæan Genera.			English Names.
<i>Eleagnus</i> ,	—	—	Oleaster, or Wild-olive.
<i>Hippophae</i> ,	—	—	Bastard-Rhamnus, or Seed-Buckthorn.
<i>Osyris</i> ,	—	—	Poet's-Casia.
<i>Trophis</i> .			

The last Genus is only to be found in the improved Editions of the Fragments.

Habit and Structure of the Plants of this Order.

All the plants of this order are of the shrub and tree kind. Some of them rise to the height of twelve or fourteen feet, as the wild olive; others to not above two or three, as poet's casia.

The **ROOTS** are branched, fibrous, and woody.

The **STEMS** are cylindric.

The **BRANCHES**, when young, are cornered.

The **BUDS** are of a conic form, and without scales.

The **LEAVES** are simple, alternate, and attached to the branches by a very short foot-stalk.

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The FLOWERS are male and female upon distinct roots, in the three last genera; hermaphrodite and male upon the same root, in wild olive, *elæagnus*; where two male flowers are produced by the side of an hermaphrodite flower, at each wing, or angle of the leaves.

Note.—Linnæus, not attending to this circumstance, places *elæagnus*, in the first order of his class *tetrandria*; which, according to his plan, should consist only of hermaphrodite flowers.

The CALYX, in this order, is a *perianthium*, which is composed of one leaf, divided into two segments, in sea buck-thorn; into three in poet's casia; and into four in wild olive. It is commonly placed upon the *germen*, which it accompanies to maturity.

Note.—The male plants of the genus *trophis*, have no calyx.

The COROLLA, in plants of this order; is universally wanting, except in *trophis*, the male plants of which, according to Linnæus, have four obtuse and spreading petals.

The STAMINA are generally four in number, slender like a hair, short, placed at a considerable distance from the style, and inserted into the tube of the calyx.

Poet's casia has only three stamina, which are opposite to the divisions of the calyx.

The PISTILLUM is composed of a roundish *germen*, crowned with the calyx; a single thread-shaped *style*; and a cylindric *stigma*, which, in poet's casia, is deeply divided in three.

The SEED-VESSEL in the first genus, *elæagnus*, is an obtuse, oval fruit, of the cherry kind (*drupa*), with a puncture at the top, inclosing an oblong, obtuse nut; in the three other genera, a globular berry, (*bacca*), with one cell, containing a roundish seed.

In poet's casia, the seed is hard like a stone, and fills the whole cavity of the *pericarpium*.

The plants of this order are astringent.

From the odoriferous flowers of the wild-olive is drawn an aromack and cordial liquor, which has been successfully used in putrid and pestilential fevers.

Sea buck-thorn is purgative; poet's casia, highly astringent.

The name *elæagnus* is derived from 'Ελαία, an olive, and 'Αγνος, *vitex*; because the plant hath leaves like those of the chaste-tree, *vitex agnus castus*, and a fruit like an olive.

The yellow flowers of the oleaster or wild olive of Boemia, *elæagnus angustifolia*, emit a strong, agreeable scent, when fully expanded; from which circumstance, says Mr. Duhamel, the Portugeze have given the name of *tree of Paradise* to this plant.

The genus *elæagnus*, is not to be confounded with the oleaster or wild olive of Parkinson, Gerard, and Ray. This last is only a particular species of olive, called by Tournefort and Caspar Bauhin, *olea sylvestris*, and described to have a hard leaf, which is hoary on its under side. It grows naturally in woods, in the south of France, Spain, and Italy, and is never cultivated.

The wild olive, *elæagnus*, is said to possess the same virtues as the olive-tree. *Vide SEPIARIÆ.*

In *elæagnus latifolia*, which grows naturally in the island of Ceylon, and some other parts of India, the leaves continue green all the year.

The berries of bastard rhamnus, or common fallow-thorn, as it is sometimes called, observes Linnæus, in his *Flora Suecica*, dye yellow. They are exceedingly acid, and by the fishermen of Aland, one of the Swedish islands, prepared into an embamma, or sauce, which gives to their fish a very agreeable flavour. The shrub flowers in the early part of the spring, before it puts forth leaves, and in a sandy situation, that is exposed to the sun, is used for hedges.

The berries of the genus *trophis* are esculent.

CALYCIFLORE, is likewise the name of the eleventh class in Royen's Natural Method; and of the forty-eighth order in Lud. Gerard's Arrangement of the Plants that are natives of Provence, in France. In Royen's Method it is a very extensive class, comprehending all plants which have the filaments of the *stamina* inserted into the *perianthium*. It

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exactly corresponds to the class *Floribundi*, in Linnæus's *Methodus Calycina*; and, besides the class *Icosandria*, in the sexual method, includes the orders *Calycanthemæ*, and *Calycifloræ*, which have been analysed above. *Vide FLORIBUNDI*, and *ICOSANDRIA*.

In Lud. Gerard's Method, the order *calycifloræ* is the same as in Linnæus.

CALYCINI, (from *calyx*, the flower-cup); the name of the sixteenth class in Wachendorffius's Natural Method, consisting of plants with visible flowers, which have a flower-cup, and whose seeds are furnished with a single *cotyledon*, or lobe. *Vide COTYLEDONES*. It is exemplified in *rush*, *criphorum*, and *cnymorium*.

CALYCISTÆ, (from *calyx*, the flower-cup). Systematic botanists so termed by Linnæus, who have arranged all vegetables from the different species, structure, and other circumstances of the calyx, or flower-cup.

The only systems of this kind are the *Charaeter Plantarum novus*, a posthumous work of Magnolius, professor of botany at Montpelier, published in 1720; and Linnæus's *Methodus Calycina*, published in his classes *Plantarum*, at Leyden, in 1738.

By the *internal calyx*, in Magnolius's Method, is meant the *pericarpium*, or seed-vessel.

CALYPTRA, (from *καλυπτω*, *tego*, to cover); a veil, or covering; one of the seven species of *calyx*, enumerated in the *Philosophia Botanica*, and defined to be the proper calyx of the mosses. It is placed over the *anthers* or summits, and in figure resembles an extinguisher, hood, or monk's cowl. *Vide MUSCI*.

The term was first used in this sense, by Dillenius, to whom we owe the principal discoveries that have been made in the moss, mushroom, and *lichen* tribes.

The *Calyptra* is either

Acuminata, pointed, as in *minium*, and *bryum*.

Caduca, falling off early, and before the bursting of the anthers, as in *buxbaumia*.

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Conica, of a conic form, as in most mosses.

Glabra, smooth and shining, as in *hypnum*.

Lævis, polished, without any inequalities, as in *splachnum*.

Oblonga, of an oblong figure, as in *minium*.

Villosa, hairy, or shaggy, as in golden maiden-hair, *polytrichum*.

In some genera, as *lycopodium*, *porella*, *sphagnum*, and *phascum*, the *calyptra* is wanting.

CALYPTRA, by Tournefort, and former botanists, was used to signify the proper exterior covering or coat of the seed, which falls off spontaneously. *Vide* ARILLUS.

CALYPTRATI, (from *calyptra*) the name of one of the principal divisions in Dillenius's Arrangement of the Mosses; containing such of those imperfect plants as are furnished with the small membranaceous calyx called *calyptra*. *Vide* CALYPTRA.

This class, which is exemplified in water-moss, *fontinalis*; and golden maiden-hair, *polytrichum*; stands opposed to the class or division *Calyptra Destituti*, mosses wanting the *calyptra*, of the same author. *Vide* MUSCI.

CALYX, (Gr. Καλὺξ, a Καλυπτω, *tego*—*calyx*, *rosa clausa*, *theca*, *vel cui aliquid includitur ut folliculus*, *putamen*, &c.—properly the bottom of a rose-bud not fully blown). The outer covering of the flower, commonly called the flower-cup, which, in the greater number of plants, incloses and supports the bottom of the *corolla*. *Vide* COROLLA.

It is defined by Linnæus to be the termination of the *cortical epidermis*, or outer bark of the plant, which, after accompanying the trunk, or stem, through all its branches, breaks out with the flower, and is present in the fructification, in this new form.

I am not, at present, to enquire into the propriety of a definition, which, by the way, contains neither the description nor use of the part in question: but only mean to oppose to the opinion contained in it, that of a very learned naturalist of the last century; Dr. Nehemiah Grew, who,

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in his Anatomy of Plants, a most ingenious and elaborate work, thus expresses himself, with regard to the origin of the flower-cup. "The impalement, (*calyx*), whether of one or more pieces, I call that which is the outmost part of the flower, encompassing the other two; viz. the foliation, (*Corolla* of Linnæus) and the attire, (*Stamina* and *Pistillum*). It is compounded of the three general parts, the skin, the cortical and lignous bodies; as is evident from the artichoke, in which the continuation of all these parts is clearly discoverable; the empalers being of that amplitude, as fairly to shew them all." *Grew's Anatomy of Plants*, p. 35.

By former botanists, the term *calyx* is always used in its proper and restricted sense, as expressed above, and corresponds, therefore, to what, in the modern systems, is denominated *perianthium*.

By Linnæus, the reformer of botanical language, it is employed with much more latitude, as a generical term, comprehending the seven following species.

1. Perianthium, *Calyx* of Tournefort and others.
2. Involucrum.
3. Amentum, *Julus* of Tournefort.
4. Spatha.
5. Gluma, *Locusta* of Ray.
6. Calyptra.
7. Volva.

These different appellations of the calyx, for they are no other, depend upon circumstances, which will be explained under each particular term. At present we may observe, that of the seven species above enumerated, the first, *perianthium*, is by much the most common; an *involucrum*, is almost peculiar to umbelliferous flowers; *gluma*, to the grasses; *amentum*, to another order of plants; *calyptra*, to mosses; and *volva*, to mushrooms. When we speak, therefore, of the proportion, figure, situation, or singularities of the *calyx*, we would always be understood to mean, that species of calyx called *perianthium*. The other species, which differ remarkably both in appearance and structure

from the first, are always denominated by their own proper names; that no confusion, amidst such a diversity of terms, may arise.

CALYX, then, being a general or generical term, and used, even when employed as a particular species, for the *perianthium*, it was thought proper to refer to that head the structure, and singularities of this first part of the fructification. *Vide PERIANTHIUM.*

General Remarks.

1. Malpighi's, Ray's, Tournefort's, and Ludwig's Definition of the calyx, is applicable only to the *perianthium* of Linnæus.

2. The calyx is of a coarser substance, and thicker than the corolla.

3. The leaves of the calyx are generally green; those of the corolla coloured.

4. Notwithstanding such essential differences, nature seems to have put no absolute limits between these parts of fructification; for in many plants, as *barbisa*, the calyx, or *perianthium*, is deeply coloured; and there are many flowers,—hellebore, and star of Bethlehem, for instance,—which, having a coloured *corolla*, and no calyx, are subject to lose their petals, about the time of flowering: but these afterwards hardening, turn green, and remain on the plant like a calyx.

In *daphnis*, the calyx and corolla are joined together, and united in the margin like a leaf of box. *Lin. Phil. Bot.* p. 58.

Burning thorny plant, or spurge, *euphorbia*, has been often erroneously described as monopetalous, by those who have mistaken the *calyx* for the *corolla*.

A more sure mark of distinction betwixt the calyx and corolla, in doubtful cases, is given under the article COROLLA, which see.

5. Both calyx and corolla are sometimes styled by Linnæus, the covers of the flower, *tégumenta floris*. Ludwig calls them by another name, of the same import, *involucra*.

6. In establishing the analogy betwixt the animal and vegetable

vegetable kingdoms, Linnæus has distinguished the calyx by the name of *thalamus floris*, or the conjugal bed.

7. The calyx, in the language of Tournefort, becomes the fruit, when the *receptacle* of the flower is placed upon the *germen*; which has, for its *receptacle*, the *extremity of the pedunculus* or foot-stalk, to which it is attached. This description corresponds to the *germen inferum*, or *flos superus* of Linnæus, and is exemplified in campanula, madder, lady's bed straw, cucumber, marvel of Peru, valerian, and the umbelliferous flowers.

8. For a sure method of distinguishing the calyx from a *bractea*, or floral-leaf, with which it is frequently confounded, see the article BRACTEA.

9. The following quotation, from Alston's *Tyrocinium Botanicum*, published at Edinburgh, in 1753, will give the reader a just idea of the proportion that obtains in point of number, betwixt the several species of calyx above enumerated. The *Genera Plantarum* at that time contained only 1021 genera. Of these, says Dr. Alston, 673 have a *perianthium* for their calyx; 72 a *spatha*; 75 an *involucrum*; 29 a *gluma*; 18 an *amentum*; and 3 a *calyptra*. *Votua*, though described in the *Phil. Bot.* to be the membranaceous calyx of the mushrooms, yet, in fact, is never once mentioned in the *Genera Plantarum*, among the characters of the 11 genera of that kind of Imperfect plants there enumerated. About 110, he continues, want the calyx altogether; 25 have both a *perianthium* and *involucrum*; and a few plants have both a *perianthium* and *spatha*. Besides, in *eriophorum*, *xylis*, cypress-grafs, *cyperus*: and rush-grafs, *scirpus*; the *spike* is a calyx: in *morinda*, and sea-holly, *eryngium*; the *common receptacle*.

10. The design of the empalement, (*calyx*) says Grew, is to inclose, secure, and support the other parts of the flower; to be their security before its opening, by intercepting all extremities of weather; and afterwards to be their support, by containing all the parts in their due, and most graceful posture.

Hence, continues the same author, we have the reason, why the calyx is frequently various, and sometimes wanting.

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Some flowers have none, as tulips; because, having a fat and firm leaf, (*petalum*;) and each leaf, likewise standing on a broad and strong basis, they are thus sufficient to themselves. Carnations, (*dianthus*;) on the contrary, have not only an empalement, but that, for greater support, of one piece: for, otherwise, the foot of each leaf, or petal, being very long and slender, most of them would be apt to break out of compass. In the same flower, the top of the empalement is indented; that the indentments may protect the petals, by being lapped over them before their expansion, and afterwards may support and prop them up, by being spread under them.

CAMPANACEÆ, (from *campana*, a bell); bell-shaped flowers. The name of the twenty-ninth order, in Linnæus's Fragments of a Natural Method.

List of the Genera contained in this Natural Order.

SECTION I.

Bell-shaped Flowers, with distinct Anthers or Summits.

Linnæan Genera.

English Names.

<i>Campanula</i> ,	—	—	Bell-Flower.
<i>Convolvulus</i> ,	—	—	Bindweed.
<i>Evolvulus</i> .			
<i>Ipomœa</i> ,	—	—	Quamoclit, or Scarlet Convolvulus.
<i>Phyteuma</i> ,	—	—	Rampions.
<i>Polemonium</i> ,	—	—	Greek Valerian, or Jacob's Ladder.
<i>Röëlla</i> .			
<i>Trachelium</i> ,	—	—	Blue umbelliferous Throatwort.

SECTION II.

Bell-shaped Flowers, with Anthers united into a Cylinder.
(Syngenesia.)

<i>Jasione</i> ,	—	—	Rampions with scabious heads, or sheep-scabious.
<i>Lobelia</i> ,	—	—	Cardinal Flower.

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Linnæan Genera.

English Names.

Viola,

—

—

Violet, or Heart's-ease.

Habit and Structure of the Plants of this Natural Order.

The plants of this order are generally herbaceous, and perennial. Some of the bell-flowers and bindweeds are annual; and a few foreign species of the latter have woody stalks.

The ROOTS are either spindle-shaped, as in bell-flowers and rampions; or branched and fibrous, as in convolvulus.

The STEMS are round, and, in convolvulus, twisted, in a direction opposite to the diurnal motion of the sun.

The BRANCHES are generally alternate.

The LEAVES are simple, alternate, and commonly attached to the branches by a semi-cylindric foot-stalk, which is furrowed above. The indentments are terminated by a small white tubercle or knob, which renders them conspicuous.

Note, in some species of *lobelia*, the leaves are opposite.

The FLOWERS are hermaphrodite, and proceed either solitary from the wings of the leaves, or are collected into a spike and head, at the end of the flower-stalk. In some species of *campanula*, they grow out of the angle formed by the stem and branch.

The CALYX, in this order, is universally a perianthium, situated upon, or round the *germen*, and generally composed of one leaf deeply divided into five segments. In *convolvulus*, and violet, it consists of five distinct leaves; the common calyx, in sheep-scabious, *jaspione*, is composed of a like number.

The COROLLA, is monopetalous, and of the bell, funnel, or wheel shape. Umbelliferous throat-wort, *jaspione*, and the violet, have five distinct petals, which, in the last, are unequal.

The TUBE, in flowers of the bell and wheel shape, is very short; in those of the funnel shape very long. In Greek valerian, the tube is shut with five valves, which are placed on its *apex*.

The LIMB, or upper part of the *corolla*, is deeply divided into

into five segments, which spread, and are alternate with the divisions of the calyx.

In some species of *campanula*, as Venus's looking-glass, the *corolla* is very small; and in others, becomes almost insensible. In *convolvulus*, it is beautifully plaited.

The *Corolla* in this order, is generally permanent; that is, accompanies the seed-bud to its maturity.

Bell-flower, *roella*, and the violet, are furnished with a NECTARIUM, which, in the two former, consists of five scales placed in the bottom of the petal; in the violet, of a substance, which, in figure, resembles a horn, or cock's spur, and terminates the upper petal of the *corolla*. Vide CALCAR.

The STAMINA are five in number, attached to the base of the tube of the *corolla*, alternate with its divisions, and opposite to those of the calyx. In bell-flower, and *roella*, the stamens are inserted into the nectarium; and in Greek-valerian, into the valves of the tube.

The FILAMENTS, or threads, are distinct, very large at their origin, and frequently approach, so as to form a sort of vault, which covers the summit of the *germen*. They are slender and awl-shaped above.

The ANTHERS, or summits, are very long, oval, marked with four longitudinal furrows, and either distinct, as in the first section; or united in a cylinder, as in the second.

The POLLEN, or male-dust, is composed of very small, spherical, white, shining, and transparent particles.

The GERMEN, or seed-bud, is roundish, and situated, either wholly, or in part, under the flower.

The STYLE is generally single, and of the length of the *stamina*, or *corolla*.

Note, the genus *convolvulus* has four styles.

The STIGMA, or top of the style, is commonly single, but deeply divided, as in bell-flower, Greek valerian, and rampion, *phyteuma*. *Convolvulus*, and *roella*, have a double stigma.

The SEED VESSEL is a roundish capsule, generally divided into three cells, and furnished externally with the same number of valves.

Note.

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Note. The capsule of the violet consists of only one cell: that of *roella*, *jassone*, and *lobelia*, of two.

The figure of the seed-vessel in the genus *campanula*, is exceedingly diversified. In nettle leaved bell-flower, *campanula trachelium*, it is hairy, rough with knots, and divided into three cells. In *campanula rapunculus*, smooth, and egg-shaped; in Canterbury bell-flower, *campanula Medium*, furnished with five cells, and the same number of valves; and in Venus's looking-glass, prism-shaped, with three cells.

The SEEDS are small, numerous, attached to a receptacle in the center of the fruit, generally rounded, and sometimes cornered.

The plants of this order abound with a white milky juice, which, upon the stalk being cut, flows out in great quantities. *Vide LACTESCENTIA.*

The roots and leaves of *campanula rapunculus*, (rampion,) are prescribed, in decoction, for disorders of the wind-pipe. They are much cultivated in France for fallads; as they were in this country some years ago, though now almost universally neglected.

A decoction of the roots of a species of American *lobelia*, which Morison describes under the name of *rapunculus galeatus Virginianus*, *flor. violacco majore*, is said to cure the most inveterate venereal disorders, in the short space of ten, or fifteen days.

Besides those already mentioned, and many others, this natural order furnishes the following excellent medicines: scammony, turbeth, and jalap.

SCAMMONY is the inspissated juice of the roots of a species of bind-weed, called by Tournefort, *Convolvulus Syriacus*, and *Scammonia Syriaca*; by Linnæus and Miller, *Convolvulus Scammonia*, Syrian bind-weed, and Syrian scammony.

This plant, which grows naturally in Syria, and the Levant, bears green leaves, almost in the shape of an heart, or nearly approaching to those of ivy. The flowers are white, and of a bell-figure. The branches extend themselves

selves on every side, to the distance of four or five feet: they are slender, and trail on the ground, if not properly supported. The plant is hardy, and will thrive very well in the open air in England, provided it is placed in a dry soil.

To procure the drug in question, incisions are made into the roots of the plant, and shells placed under the wounds, to receive the milky juice which flows out. This juice is then thickened by means of fire; and afterwards put up in cods, or lumps, for exportation.

The best scammony comes from Aleppo, and St. John d'Acre. It is light, grey, tender, brittle, resinous, grinds to a grey powder, of a bitter taste, and faint, unpleasant smell. That which is heavy, hard, and black, is to be rejected, and is, in fact, either the juice of the whole plant, or what has been burnt, and otherwise damaged in the operation of thickening.

This concreted juice, which, by the way, is frequently sophisticated, is reckoned one of the strongest purgatives, and is therefore never given without a corrector. In weak habits, it is apt to occasion irritations, and even inflammations; and therefore ought never to be administered when there is the least suspicion of inflammation in any part of the *abdomen*. It is likewise a very uncertain purge, sometimes not operating at all; at other times causing fatal superpurgations: and, what is very remarkable, it often does not operate at all the first day, but brings on afterwards an insupportable purging, followed by that violent inclination, called by physicians, *Tenesmus*.

Scammony admits of various preparations. These are the most common: 1. *Diagrydium*, or scammony prepared, and corrected with the juice of quinces. This is a very proper ingredient in the *Pulvis Cornachini*, which has all the virtues of scammony, without any of its bad effects. 2. Scammony sulphurated. 3. Scammony vitriolated. 4. Extract of *Diagrydium*. 5. Extract of Scammony. 6. Syrup of Scammony.

All the preparations of this juice, says Pomet, in his
History

History of Drugs, are prevalent against old contumacious diseases; such as gout, scurvy, dropsy, rheumatism, obstructions, head-achs, apoplexies, and remains of the venereal disease.

Besides the Aleppo scammony, there are two other sorts, commonly sold by the names of Smyrna and Indian scammony. The former is black, heavy, full of stones, shells and other extraneous matter; the latter grey, light, and brittle; and discovered, by minute examination, to be a composition of some very strong purgative powders made up of resin.

TURBITH is a species of bind-weed, called by Ray, *Convolvulus Indicus*, *Alatus*, *Maximus*, *foliis Hibisco nonnihil similibus, angulosis*; and by Linnæus, and Miller, *Convolvulus Turpethum*, turbith of the shops; it is described to have angular heart-shaped leaves, a quadrangular membranaceous stalk, and foot-stalks which support many flowers.

The plant grows naturally in Ceylon and Malabar, in the East Indies. It is perennial, having thick fleshy roots, which spread far in the earth, and abound with a milky juice, that flows out when the roots are broken or wounded; and soon hardens into a gummy substance, when exposed to the sun and air. From the root shoot forth many twining branches, which twist about each other, or the neighbouring plants, like the common bind-weed; the leaves and flowers resemble those of the marsh-mallow. The roots of this plant, the only part used in medicine, are brought to us from India, by the name of turpethum, and turbith.

Turbith, say writers on the *Materia Medica*, is a pretty strong cathartic; purging tough serous humours from the remote parts, and thereby affording ease in the dropsy, gout, and rheumatism. Being given alone, says Lemery, it is apt to cause loathing and vomiting; and is therefore corrected with ginger, cardamoms, and grains of paradise.

The root of the white thapsia is often unskilfully administered by apothecaries and druggists, for the true turbith.

Both black and white thapsia are exceedingly violent in their operations; and the juice, or milk, in the latter particularly,

cularly, is so sharp, that being rubbed upon the face, it will carry off the skin along with it. For this reason, the roots ought to be placed among the violent medicines, the use of which is very dangerous.

JALAP, the root of which has long obtained a merited place in our Dispensatories, is generally ranked with the bind-weeds, and termed by Ray, in his History of Plants, *Convolvulus Americanus Jalapium dictus*. It is described to have foot-stalks with single flowers, a tuberous root, and variable leaves, some of them being heart-shaped, others angular, and some oblong and pointed. The plant, which will not thrive in England, unless preserved in a warm stove, grows naturally in a territory of the Spanish West-Indies, situated between La Vera Cruz and Mexico, called Xalapa, or Jalapa, (the X, and J consonant being in Spanish of the same sound, and interchangeable,) from whence the drug in question derives its name. It has been found a matter of great difficulty, notwithstanding every possible research, to ascertain the genus of the vegetable producing this excellent medicine; nor does the place which it now holds in the Sexual System meet with universal approbation. Caspar Bauhin's title was, *Bryonia Mechoacana nigricans*. Father Plumier, an eminent French botanist of the 17th century, having asserted in his *Description des Plantes de l'Amerique*, that Jalap was a species of Marvel of Peru, (*mirabilis*); Tournefort was induced, upon his authority, to constitute a genus from that plant, under the title of *jalapa*. Plumier's opinion, too, was at first adopted by Linnæus, who, both in his *Species Plantarum* and *Materia Medica*, has distinguished the plant whose history we are tracing, by the name of *Mirabilis Jalappa*. In his 12th edition, however, of the *Systema Naturæ*, published at Stockholm in 1767, he renounces his former idea, transferring the plant in question to the genus *convolvulus* by the name of *Convolvulus Jalapa*, on the testimony of Miller, author of the Gardener's Dictionary, who had received some roots from Dr. Houston, in the West-Indies, which, on due examination, were found to be the true officinal
jalap;

jalap; and; from the doctor's report, pertained to a plant which was manifestly a species of bind-weed. That the botanical characters, however, are not yet so sufficiently ascertained as to give satisfaction to all, we may collect from this circumstance, that, in the London Pharmacopœia, this medicine is distinguished by no scientific name. Dr. Lewis, after the Edinburgh Dispensatory, terms it *Convolvulus Jalapa Linnæi*.

Dr. Houston, whom I just mentioned, had procured some roots of the true jalap, which he planted in Jamaica, as well with a view of fixing the genus as of cultivating the plants in that island. During his stay there, they thrived very well; but soon after he left the country, as Miller informs us, the person to whose care he committed them, suffered the hogs to root them out and destroy them, so that, when some time after, he returned thither, there were no remains of them left; nor, as far as I can learn, has the plant been introduced into any of the British islands since that time.

Jalap has a large root, of an oval form, full of a milky juice: from it proceed many herbaceous triangular twining stalks, rising to eight or ten feet, and garnished with smooth leaves, which stand upon long foot-stalks. The flowers are said to be bell-shaped; like those of the common great bind-weed.

The root of this plant is reckoned an excellent cathartic, particularly in expelling serous and watery humours; but should be administered with caution, according to the strength and age of the patient, because it works very vigorously.

Distillers, and brewers, make great use of jalap, for exciting a fermentation.

Sea bind-weed, called likewise *soldanella*, and *brassica marina*, has been prescribed in dropsies, with great success. The plant grows naturally on the sea-beach, in many parts of England, but cannot be long preserved in gardens. It has many small, white, stringy roots, which spread wide, and send out several weak, trailing, reddish stalks, which twine about the neighbouring plants like the common bind-weed.

weed. The leaves are almost round, smooth, shining like those of the lesser celandine, but thicker. The flowers are of a purple colour, bell-shaped, and succeeded by a fruit that is almost round, and membranous, and contains a cornered seed, black, or white. The whole plant has a bitter taste, and is a little saltish.

The roots of Spanish potatoe, *convolvulus batatas*, are esculent. They are annually imported from Spain and Portugal, where they are greatly cultivated for the table: but they are too tender to thrive well in the open air in England. The plants are propagated by the roots, in the same way as the common potatoe, but require much more room.

The leaves, flowers, seeds, and roots of purple violets, *viola odorata*, are used in medicine. The leaves are emollient, and laxative; the flowers anodyne; the seeds useful in obstructions of the kidneys and the nephritic cholic; the roots purgative and emetic. From a repeated infusion of the flowers in the purest rain-water, is prepared the syrup of violets, which is cordial, corrects every thing acrimonious, and loosens the belly.

The violet is one of the four cordial flowers.

Greek valerian, obtained the name of *polemonium*, according to Pliny, from *πολεμεῖν*, to wage war, on account of the contests which arose betwixt two princes, each claiming the honour of discovering it.

The plants in the genus *lobelia*, according to Linnæus, are poisonous. *Vide Phil. Bot.* p. 293.

This deleterious quality is said to be particularly observable in two species; *Lobelia Longifolia*, a native of Jamaica, and a Peruvian species, vulgarly known by the name of *Tupa*, which Father Feuillée affirms to be so exceedingly noxious, that the smell of it excites strong and long continued vomiting.

Lobelia Dortmanna, the aquatic bell-flower of Blair, possesses a more than ordinary share of that lactescence which we announced above to be a general attribute of the plants of this natural order; even the leaves which grow under water abounding with milk.

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We learn from the *Flora Suecica*, that the blossoms of *Jasione montana* are peculiarly acceptable to bees; and that a green paint is procured from the flowers of round-leaved campanula.

CAMPANACEÆ, is likewise the forty-ninth class in Lud. Gerard's Arrangement of the Plants that are natives of Provence, in France; consisting of these four genera,—*campanula*, *phyteuma*, *jasione*, and *samolus*.

CAMPANIFORMES *Herbæ*, (from *campania*, a bell; and *forma*, a figure). The name of the first class in Tournefort's Method, consisting of herbs and under-shrubs which have a simple flower, with a monopetalous corolla in the shape of a bell, or basin. *Vide* COROLLA.

This class, in Tournefort, is subdivided into seven sections or orders, from the situation of the *germen*, and nature of the fruit.

Mandrake; deadly night-shade, *atropa*; lily of the valley, *convallaria*; butcher's-broom; honey-wort; gentian; water-leaf; soldanella; convolvulus; dodder, *cuscuta*; burning thorny-plant, *euphorbia*; cassava, *jatropha*; glaux; wood-sorrel, *oxalis*; rhubarb, *rheum*; navel-wort, *cotyledon*; dog's-bane, *apocynum*; Virginian silk, *periploca*; swallow wort, *asclepias*; mallow; marsh-mallow; bastard-mallow; *lavatera*; Indian-mallow, *sida*; althæa frutex, *hibiscus*; cotton, *gossypium*; bryony, *tamus*; single-seeded cucumber, *sicyos*; male balsam apple, *momordica*; cucumber; gourd; bell-flower; rampions; cross-wort, *valantia*; madder; and ladies bed-straw, *galium*; are the bell-shaped flowers of Tournefort.

CAMPANIFORMES, is likewise the name of the sixth and twenty-third classes in Pontedera's System, consisting of herbs and trees with bell-shaped flowers.

CANDELARES, the name of an order in the early editions of Linnæus's Fragments of a Natural Method, consisting of these three genera: *rhizophora*, mangrove; (the candel or kandel of the *Hortus Malabaricus*); *nyssa* and *minuifops*. They are removed in the later editions into the order HOLERACEÆ, which see.

CANDOR, the whites; a disease incident to trees. See the article VARIETAS.

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CAPILLARES *Herbæ*, (from *capillus*, hair); capillary, or hair-shaped plants. The name of a class in Morison, Ray, and Boerhaave, consisting of those imperfect plants called ferns. It corresponds to the sixteenth class in Tournefort's System, and to the first order *Filices*, of the class *Cryptogamia*, in the Sexual Method. *Vide* **FILICES**, and **CRYPTOGAMIA**.

CAPILLUS, a term of measure, or dimension. *Vide* **MENSURA**.

Note. Linnæus calls the calyx of the female flowers of cat's-tail, *typha*; **CAPILLI PAPPOSI**, downy hairs. *Vide* **PAPPUS**.

CAPITATUS *Flos*, (from *saput*, a head). A fructification, generally consisting of many flowers firmly connected on the summits of the foot-stalk, so as to form a knob, or head. It is exemplified in globe amaranth, *gompbrena*. *Vide* **CAPITULUM**.

CAPITATÆ, is the name of a class in Ray's Method, and of a division, or section, in Linnæus's Arrangement of the compound flowers, which constitute the forty-ninth order, in his Fragments of a Natural Method. *Vide* **COMPOSITÆ**.

CAPITULUM, a little head. A mode of inflorescence, in which many flowers are collected into a head, at the extremity or summits of the foot-stalk; as in globe amaranth, *gompbrena*.

A *Capitulum* is either

Dimidiatum, halved; resembling half a head, hemispherical; as in *lippia hemisphærica*.

Foliosum, leafy, intermixed with leaves.

Globosum, round, of a globular form; as in globe amaranth, *gompbrena*.

Hispidum, bristly; as in field basil, *clinopodium vulgare*.

Nudum, naked, having no leaves, opposed to *foliosum*.

Ovatum, egg-shaped; as in *lippia ovata*.

Pedunculatum, furnished with pedicelli, or little foot-stalks; as in *teucrium capitatum*. *Vide* **PEDICELLUS**.

Pyramidatum, shaped like a pyramid; as in *lippia Americana*.

Sessile,

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Scffile, having no peduncles or flower-stalks; as in *tenu-erium pumilum*.

Subrotundum, roundish; as in *felago fruticosa*.

Note. The anthers of the mosses are stiled by Linnæus, **CAPITULA**, heads, or tops. *Vide Phil. Bot.* p. 223.

CAPREOLUS, (diminutive from *caprea*, used by Varro for a branch that putteth forth tendrils,) a tendril. *Vide CIRRUS*.

CAPRIFICATIO, (from *caprificus*, a wild fig); the very singular husbandry or management of fig-trees.—Caprification.

Before I enter upon a particular discussion of this curious subject, which furnishes one of the principal arguments for the doctrine of the sexes of plants, I would previously remark, that the fruit of the fig-tree is not a *pericarpium* or seed-vessel, as other fruits, but a *receptacle*, inclosing and supporting the flowers within it.

These flowers, in the cultivated fig-tree, are *female* only; but of the wild figs, some have *male* flowers; others have both *male* and *female* flowers distinct, though lodged within the same receptacle.

This being premised, two questions naturally occur: 1, In what manner are the flowers of the cultivated fig-tree fecundated? 2, How happens it, that the fruit of our fig-trees ripen, if the flowers are of one sex only, and have no assistance from the male? For it is not pretended that there are any male fig-trees in this country.

The difficulty of the first question is not immediately perceived. In the islands of the Archipelago, and other countries, where the wild, or male figs, grow in the neighbourhood of the female, why may not the fecundation of the flowers of the latter, by the sprinkling of the male-dust, be performed with as great facility as that of the palm trees, and even of many plants in our own country, which bear flowers of different sexes on distinct roots? I answer, because in fig-trees there is no communication between the male and female flowers. They are inclosed within the fruit, which, as we observed above, is not a *pericar-*

pitum, but a *receptacle*. How then, the question still recurs, is that fecundation effected? In a manner so singular, that were not the facts properly authenticated, they would exceed belief. A very small kind of gnat, of a black colour, nowhere to be seen but about these trees, makes a puncture into the figs, at the time of their flowering, and there deposits, along with its eggs, the dust, or fecundating vapour of the stamina of the male, or wild fig, in which it had been formerly inclosed. These insects, whose worms can only subsist in the kernels of the fig-seeds, probably foresee, by a sort of wonderful instinct, that, if the seeds are not fertilized, they can produce no kernels, and consequently no nourishment to their worms. For this reason, immediately after their transformation, they issue out of the fig, which has in some measure given them birth, copulate, repair to other figs, which are then in flower, prick them, enter by the aperture they have made, sprinkle the fertilizing dust of the stamina, which remains attached to several parts of their body, upon the stigma, or summit of the germen; and making a puncture into the germen, or seed-bud itself, there deposit their eggs, one in each *germen*. Here the little worm being hatched, is nourished with the substance of the kernel, till having attained its full size, and totally consumed its proper nourishment, it is transformed, first into a *nympha*, and afterwards into a winged gnat, which, with its teeth, opens a passage for itself through the cavity of the *germen*, issues out of the fig, and, like its mother, takes the necessary precautions to perpetuate the species in other figs.

Such is the singular husbandry and culture of fig-trees, as practised in Malta, Italy, and the islands of the Archipelago; countries where the fig-trees susceptible of caprification naturally grow.

The most ample and satisfactory accounts of this curious operation in gardening, are those of Tournefort and Ponsédera: the former in his *Voyage to the Levant*, and in a memoir delivered to the Academy of Sciences, at Paris, in 1705: the latter in his *Anthologia*, or *Philosophy of Flowers*.

Tournefort's relation is, in substance, as follows.

Of the thirty species, or varieties of the domestic fig, which are cultivated in France, Spain, and Italy, there are but two cultivated in the Archipelago.

The first species is called *ornos*, from the Greek ἐγὼς, which answers to *caprificus* in Latin, and signifies a wild fig-tree. The second is the domestic, or garden fig-tree.

The former bears successively, in the same year, three sorts of fruit, called *fornites*, *cratitires*, and *orni*, which, though not good to eat, are found absolutely necessary towards ripening those of the garden fig. These fruits have a sleek, even skin; are of a deep green colour, and contain in their dry and meally inside, several male and female flowers, placed upon distinct foot-stalks; the former above the latter.

The *fornites* appear in August, and continue to November, without ripening: in these breed small worms, which turn to a sort of gnats, no where to be seen but about these trees. In October and November, these gnats, of themselves, make a puncture into the second fruit, called *cratitires*. These do not shew themselves till towards the end of September. The *fornites* gradually fall away, after the gnats are gone; the *cratitires*, on the contrary, remain on the tree till May, and inclose the eggs, deposited by the gnats of the *fornites* when they pricked them. In May, the third sort of fruit begins to put forth from the same wild fig-trees, which produced the other two: this is much bigger, and is called *orni*: when it grows to a certain size, and its bud begins to open, it is pricked in that part by the gnats of the *cratitires*, which are strong enough to go from one fruit to the other to discharge their eggs.

It sometimes happens that the gnats of the *cratitires* are slow to come forth in certain parts; while the *orni*, in those very parts, are disposed to receive them: in which case, the husbandman is obliged to look for the *cratitires* in another part, and fix them at the end of the branches of those fig-trees, whose *orni* are in fit disposition to be pricked by the gnats. If they miss the opportunity, the *orni* fall, and the gnats of the *cratitires* fly away. None but those that are well acquainted with this culture, know the critical moment of

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doing this ; and in order to it, their eye is perpetually fixed on the bud of the fig ; for that part not only indicates the time that the prickers are to issue forth, but also when the fig is to be successfully pricked. If the bud be too hard, and too compact, the gnat cannot lay its eggs ; and the fig drops when the bud is too open.

These three sorts of fruit are not good to eat ; their office is to help to ripen the fruit of the garden fig-trees, in manner following : during the months of June and July, the peasants take the *orni*, at a time that their gnats are ready to break out, and carry them to the garden fig-trees ; if they do not nick the moment, the *orni* fall, and the fruit of the domestic or garden fig not ripening, will, in a very little time, fall in like manner. The peasants are so well acquainted with these precious moments, that, every morning, in making their inspection, they only transfer to their garden fig-trees such *orni* as are well conditioned, otherwise they lose their crop. It is true, they have one remedy, though an indifferent one, which is, to strew over the garden fig-trees, the *ascolimbros*, a very common plant there, and in whose fruit there is a sort of gnats proper for pricking : perhaps they are the gnats of the *orni*, which are used to hover about, and plunder the flowers of this plant.

To sum up all in one word, the peasants so well order the *orni*, that their gnats cause the fruit of the garden fig-tree to ripen, in the compass of forty days. These figs are very good green ; when they would dry them, they lay them in the sun for some time, then put them in an oven, to keep them the rest of the year. Barley bread, and dried figs, are the principal subsistence of the boors and monks of the Archipelago ; but these figs are very far from being so good as those dried in Provence, Italy, and Spain : the heat of the oven destroys all their delicacy and good taste : but then, on the other hand, this heat kills the eggs, that the prickers of the *orni* discharged therein, which eggs would infallibly produce small worms that would prejudice the fruits.

What an expence of time and pains is here for a fig, and that but an indifferent one at last ! I could not, says Tournefort,

fort, (from whom this account is derived) sufficiently admire the patience of the Greeks, busied above two months, in carrying these prickers from one tree to another. I was soon told the reason; one of their fig-trees usually produces between two and three hundred pounds of figs; but those in Provence, seldom above twenty-five.

The prickers contribute, perhaps, continues the same learned naturalist, to the maturity of the fruit of the garden fig-tree, by causing them to extravasate the nutritious juice, the vessels inclosing which they tear asunder, in depositing their eggs; perhaps, too, besides their eggs, they leave behind them some sort of liquor, proper to ferment gently with the milk of the figs, and to make their flesh tender. The figs in Provence, and even at Paris, ripen much sooner for having their buds pricked with a straw dipped in olive-oil. Plumbs and pears, pricked by some insects, likewise ripen much the faster for it: and the flesh round such puncture is better tasted than the rest. It is not to be disputed, that considerable change happens to the contexture of fruits so pricked, in like manner as to parts of animals pierced with any sharp instrument.

Pontedera, in his *Anthologia*, says, that in Italy, caprification is performed by gnats, which issuing from the male figs of the wild fig-tree, *caprificus*, loaded with the dust of the stamina, make a puncture into the female figs, that is, the autumn figs of the domestic fig-tree; which they fecundate. This domestic fig-tree, he calls simply by the name of *ficus*; and remarks, that there is another species, *erinosyce*, which, in spring, bears figs, that, having many male-flowers, and few female, fall off before they ripen; and, in autumn, figs full of female flowers, and which do not ripen till the following spring.

The caprification of the ancient Greeks and Romans, described by Theophrastus, Plutarch, Pliny, and other authors of antiquity, corresponds, in every circumstance, with what is practised, at this day, in the Archipelago, and in Italy. These all agree in declaring, that the wild fig-tree, *caprificus*, never ripened its fruit; but was absolutely neces-

sary

fary for ripening that of the garden, or domestic fig, over which the husbandman suspended its branches.

The species of wild fig-tree, called *ornos* in the Archipelago, grows likewise at Malta, where it obtains the name of *tokar*: the fruit, called by Tournefort, *fornites*, is stiled by the Maltese, *tokar-leouel*; the *cratitires*, *tokar-lanos*; and the *orni*, *tokar-taiept*. Besides this fig, there are seven or eight other domestic species in that island, of which they *caprify* but two. The first is that described by Tournefort, which only bears once a year; the second bears twice a year. The figs of the first crop, which is in the end of June, are sweet like honey, thicker, and much better than those of France, and arrive at perfect maturity without any assistance. Those of the second crop, are much smaller, inferior in quality to the former, and do not ripen till August, nor then, but by the assistance of caprification, without which, the greatest part of the fruit will fall off before maturity. The consequence, however, of this operation, is, that the fruit is greatly impoverished, and the first crop of the following year rendered much less. The caprified figs too, are generally yellow, and dry within; and not unfrequently inclose two or three gnats, some with, and some without wings.

In Provence and Spain, though the same species of figs are cultivated as in the Archipelago, and Malta, the curious husbandry in question has never yet been attempted. This neglect has certainly arisen from a prudent foresight, that the fruit gained not more in quantity by that operation, than it suffered in quality; for, although these countries do not produce the gnat, which is the principal agent of caprification, there is nothing in the nature of the climate, which would seem to oppose its introduction.

Pontedera, Linnæus, and others, have attributed the ripening of the seeds of the caprified fig-trees, to the fecundation of the *germina*, or seed-buds, by the dust of the stamina, conveyed to them, and lodged in their substance, by means of the gnats. In this view, caprification becomes a principal argument in supporting the curious doctrine of the sexes of plants; a doctrine, to an enlarged view of which we
are

are indebted for one of the most ingenious, and uniform, though it must be acknowledged, one of the most artificial systems that ever appeared.

Upon the whole, from the various facts that have been collected upon this head, and which the reader will find dispersed in different authors, we are led to conclude, that the principal object of caprification, thus naturally performed by the gnats, is to fecundate the seeds, which, without such assistance, would not ripen, nor, of consequence, produce kernels proper to nourish the young worms, and perpetuate their race.

We are now prepared to give a satisfactory answer to the other question proposed in the beginning of this article. "How it happens, that the fruit of our fig-trees ripen, if the plants are of one sex only, and have no assistance from the male?"

The question supposes, that the fig-trees, in this country, bring fruit to maturity without the assistance of caprification; and the fact cannot be denied. The same thing, we have seen, obtains in Spain, Provence, and Malta; but the fruit, or, more properly, the fruit-vessel, is, in all cases, to be distinguished from the seed contained within it. If the male be wanting, the seed will not vegetate when sown; but the fruit may nevertheless swell, and come to an appearance of perfection: and so it is observed to do in the instance in question, and in many others, especially where the fruit is formed of one of the parts less connected with the seed, as the calyx, receptacle, &c. though it is more common for it to drop off before it ripens, if not impregnated by the male.

Fig-trees, then, in this country, ripen their fruit, but not their seed; and can therefore be propagated only by layers, suckers, or cuttings. But the summer figs of Paris, Provence, Italy, and Malta, ripen not their fruits only, but their seed, without the assistance of caprification; as is evident from the trees being frequently raised from seed. To account for this seeming paradox, I would observe, that the cultivated fig-trees have a few male-flowers, placed above the

the female, within the same covering, or receptacle; that in Spain, Italy, and the warm climates, these male-flowers are perfect, and perform their proper office in fecundating the female: But that in colder climates, as that of England, and even in late seasons in a warm climate, the stamina of the male flowers prove abortive, and no fecundation of the seed can ensue.

Mr. de la Hire has demonstrated, in the Memoirs of the Academy of Sciences, that the summer-figs at Paris, in Provence, Italy, and Malta, have all stamina of a perfectly proper and regular conformation; and that the stamina of the autumn figs, in the same places, are abortive. Of this abortion, two causes have been assigned: 1, that the figs appear at a time, when the leaves, already old, perspire but little, and receive a very small supply of nourishment from the root: 2, that being much more numerous than the summer-figs, they require a greater supply of nourishment than the trees are, at that season, able to afford them.

CAPSULA, (diminutive from *capsa*, a box, coffer, or case) a little chest, or casket; a capsule. A dry, hollow seed-vessel, that cleaves, or splits, in some determinate manner. *Vide* PERICARPIUM.

This species of seed-vessel is frequently fleshy and succulent, like a berry, before it has attained maturity; but in ripening, becomes dry, and often so elastic as to dart the seeds from their departments, with considerable velocity. This elasticity is remarkably conspicuous in wood-forrel; balsam, *impatiens*; African spiræa, *diapsma*; fraxinella; *justicia*; *ruellia*; *barleria*; *lathræa*, and many others.

The general aptitude or disposition of this species of seed-vessel, to cleave or separate, for the purpose of dispersing its seeds, distinguishes it, not less remarkably than its texture, from the pulpy, or succulent fruits of the apple, berry, and cherry kind.

This opening of the capsule for discharging the seeds when the fruit is ripe, is either at the top, as in most plants; at the bottom, as in *triglochin*; at the side, through a pore, or small hole, as in *campanula*, and *orchis*; horizontally,

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as in plantain, amaranthus, and anagallis; or longitudinally, as in convolvulus.

All fruit that is jointed opens at every one of the joints, each of which contains a single seed.

Capsules, in splitting, or opening, are divided, externally, into one or more pieces, called by Linnæus *valves*. *Vide VALVULA.*

The internal divisions of the capsule are called cells, *loculamenta*; these, in point of number, are exceedingly diversified; some capsules have only one cell, as the primrose; others many, as the water-lily. For particulars on this subject, the reader is referred to the article *LOCULAMENTA.*

The number of capsules is generally the same as that of the *germina*, or seed-buds: for the seed-vessel is nothing else than the seed-bud arrived at maturity.

We may observe, however, that when a flower contains a number of seed-buds with an undivided cavity, that is, a single cell, these seed-buds, in the progress of vegetation, unite, and become detached, or separate cells of the same membranous capsule.

The seed-vessel consists of one capsule, in lychnis; of two in pæony, and swallow-wort; of three in lark-spur, and white hellebore, *veratrum*; of four in rose-root, *rhodiola*; of five in columbine; and of many in globe ranunculus, and marsh marigold.

The partitions which divide the capsule internally into cells are called by Linnæus, *Dissipimenta*; and the substance which connects these partitions to the seeds, *Columella*.

In convolvulus; thorn-apple, *datura*; and chick-weed; the partitions, just mentioned, separating, or detaching themselves from the top of the fruit, before its maturity, open a communication betwixt the cells, and thus render the cavity of the capsule undivided; which, in its state of *germen*, or seed-bud, consisted of numerous divisions, or cells. As the same thing may happen, from accidental causes, in many other plants, it would not be improper previously to ascertain the number of cells, as they exhibit themselves in a tranverse section of the seed-bud, in which every

every thing respecting the future fruit may be viewed in miniature. Without this precaution, numberless mistakes will be committed in fixing and discovering the genera of several plants; as of honey-suckle, cardinal flower, and others.

The terms *valvula*, *dissepimentum*, *loculamentum*, and *columella*, which Linnæus, in the *Philosophia Botanica*, considers as so many members, or distinct parts of that species of seed-vessel called *capsule*, are applied, at least some of them, with equal propriety, to any kind of dry seed-vessel.

Note. Pulpy seed-vessels of the apple kind, *pomum*, contain a capsule. *Vide POMUM.*

Capsules consisting of three cells, each of which contains a single seed, are denominated by Linnæus, *Capsule Tricoccae*. Of this sort are the seed-vessels of *euphorbia*; mercury; papaw; palma-christi; jack in a box, *hernandia*; bastard-orpine, *andrachne*; and the remaining genera, in the thirty-eighth order of Linnæus's Fragments, entitled *tricoccae* from that circumstance. *Vide TRICOCCÆ.*

A capsule is either

Acuminata, pointed, tapering to a point, as in lilac.

Trigona, three-cornered; as in Indian arrow-root, *maranta*.

Scabra, rough with knots; as in Indian flowering-reed, *canna*.

Hispida, shaggy or bristly; as in enchanter's night shade, *circæa*.

Ovata, egg-shaped; as in *pæderota*.

Subrotunda, roundish; as in Indian flowering-reed.

Globosa, round, of a globular form; as in water-milfoil, *utricularia*.

Ventricosa, big-bellied; as in corn-flag, *gladiolus*.

Oblonga, longer than broad; as in iris.

Trifurcata, having three grooves, or furrows; as in Indian flowering-reed, *canna*; and the genus *moræa*.

Nuda, naked, opposed to *hispida*; as in *commelina*.

Turbinata, shaped like a top; as in *montia*.

Emarginata, deficient in its margin, notched; as in Carolina-flax, *polypremum*.

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Bisulca, furnished with two furrows ; as in *buddleia*.

Teres, slender, and cylindrical ; as in primrose, and *sol-danella*.

Coronata, crowned with the calyx ; as in most plants which have the seed-bud placed below the receptacle of the flower.

Pentacocca, having five cells, each containing a single seed ; as in *byttneria*.

Colorata, coloured ; as in staff-tree, *celastrus*.

Muricata, prickly ; as in *byttneria*.

Succulenta, succulent, pulpy ; as in spindle-tree, *cusny-mus*.

Lignosa, of a woody substance ; as in *cedrela*.

Coriacea, of a substance like leather ; as in *cupania*.

Inflata, blown up, swelled ; as in bladder-nut, *staphylæa* ; and lesser flowering rush, *scheuchzeria*.

Compressa, flat, pressed together : as in lesser orpine, *cras-fula* ; and water plantain, *alisma*.

Carnosa, fleshy, or pulpy ; as in *pontederia*.

Pellucida, thin, and transparent ; as in superb lily, *gloriosa*.

Flaccida, feeble, flaccid ; as in bladder-nut.

Glabra, having a smooth even surface ; as in squill, *scilla* ; and spider-wort, *anthericum*.

Cordata, heart-shaped ; as in water-purslane, *peplis*.

Obcordata, heart-shaped with its tip downwards ; as in speedwell.

Conica, of a conic form ; as in *pontederia*.

Striata, superficially furrowed ; fluted ; as in French-willow, *epilobium*.

Lanceolata, shaped like a lance ; as in log-wood, *hæmatoxylum*.

Semivalvis, and *semivalvata*, having only half a valve ; as in prickly-poppy, *argemone*.

Echinata, (from *ἔχινος*, a hedge-hog) ; beset with prickles ; as in *sloanea*, and Indian-mallow, *urena* ; synonymous to *muricata*. *Vide Supra*.

Alata, winged ; as in *seguieria*.

Tomentosa,

Tomentosa, downy ; as in pæony. *Vide* TOMENTUM.
Lunulata, crescent-shaped ; as in *isopyrum*.

Bicarinata, having two prominences like the keel or bottom of a ship ; as in hellebore, and marsh-marigold.

Elastica, bursting like a spring ; as in *lathræa*, and *elaterium*. *Vide* *Supra*.

Farinacea, having a mealy sort of pulp ; as in Æthiopian four-gourd, *adansonia*.

Tricarinata, having three keels ; as in orchis, *satyrium* ; and several other genera of the class *Gynandria* of Linnæus.

Columnaris, shaped like a pillar ; as in *limodorum*, and *nepenthes*.

Bicornis, resembling two horns ; as in *ceratocarpus*.

Dicocca, having two cells, each containing a single seed ; as in *solandra*.

Scrotiformis, shaped like the *scrotum* in animals ; as in mercury.

Tricornis, resembling three horns ; as in bastard-hemp, *datisca*.

Didyma, twin-capsules ; two united in one ; as in mercury, and many other plants.

Dr. Grew, in his *Anatomy of Plants*, distinguishes all dry seed-vessels, whether capsules or pods, by the name of *seed-cases*, or *membranous uteri* ; in opposition to the pulpy seed-vessels of the apple, berry, and cherry kind, which he denominates fruits.

From the curious mechanism of these seed-cases, says that learned author, may be easily understood the reason of the violent and surprizing ejaculation of the seeds, observed in many plants. This is not a motion originally in the seeds themselves ; but contrived by the structure of the case, (*seed-vessel*.) For the seeds hanging very loose, and not on the sides of the case, as sometimes, but on a *pole*, or column, in the centre, with their thicker end downward, they stand ready for a discharge : and the sides of the case being lined with a strong and tense membrane, they perform the office of so many little bows, which remaining fast at top, and opening, or being let off at the bottom, curl forcibly upward, and so drive all the seeds before them.

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This observation, which the learned author particularly applies to a species of *polygonum*, is equally applicable to the elastic seed-vessels of other plants.

CAPSULA *Staminis*. The summits of the *stamina*. Malpighi's term for the *Anthera* of Linnæus, and *Apex* of Ray. *Vide* **ANTHERA** and **APEX**.

CARINA, a keel. The name which Linnæus gives to the lower concave petal of a pea-bloom, or butterfly-shaped flower, from its fancied resemblance to the keel of a ship. *Vide* **COROLLA** and **DIADELPHIA**.

The keel is placed close under the upper petal, called the standard, *vexillum*; and within the two side petals, called wings, *alæ*. *Vide* **VEXILLUM**, and **ALÆ**.

It incloses the *stamina*, and *pistillum*; and consists either of one petal, as in *cytissus*; or of two adhering pretty closely together; as in broom, *spartium*; and coral-tree, *erythrina*.

The *Carina* is either

Lunulata, shaped like a crescent; as in *piscidia*, and *borbonia*:

Bifida, slightly cut in two; as in African-broom, *aspalathus*:

Spiralis, spirally twisted; as in kidney-bean, *phaseolus*:

Incurva, turning back; as in ground nut, *arachis*:

Ventriculosa, bellying out in the middle; as in base tree trefoil, *cytissus*: or

Compressa, flat, that is, pressed together at the sides; as in false acacia, *robinia*; and milk-wort, *polygala*.

The line that forms the keel in this irregular petal, runs straight as far as the middle, and then rises in the segment of a circle: but the marginal line runs straight to the *apex*, where the two lines meet, and terminate obtusely.

The lower part of the base of the keel extends into a claw, which is inserted into the common receptacle, and of the length of the calyx.

The sides are similar to the wings, both in shape and situation, except that they are lower, and stand within them.

CARYOPHYLLÆUS *Flos*, (from *caryophyllus*, Tournefort's name for the clove-gilly flower, or carnation pink,
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and the clove-tree.) A flower, whose petals, generally five in number, are disposed like those of the clove-gilly flower. These are the flowers *en œillet* of French writers. They have a hollow calyx or empalement of one piece, into the bottom of which are inserted the claws of the petals. These are of the same length with the calyx. The upper part of the petals is broad, plain, and disposed on the margin of the empalement like a wheel.

Under this description are included, cucubalus; lychnis; viscous campion, *silene*; stellaria; cerastium; and several other plants, to be afterwards enumerated.

CARYOPHYLLEI, the name of the eighth class in Tournefort's, and sixteenth in Pontedera's method, consisting of *herbaceous* vegetables, whose flowers answer to the description given above.

Carnation; pink; clove-tree; lychnis; soapwort; cucubalus; flax, *linum*; and thrift, or sea-gilly flower, *statice*; are the caryophyllei of Tournefort.

CARYOPHYLLEI, is likewise the name of a very numerous family, or order, in Linnæus's Fragments of a Natural Method: containing, besides the class of the same name in Tournefort, many other plants, which, from their general appearance, seem nearly allied to it.

List of the Genera contained in this Natural Order.

SECTION I.

Carnation-like plants with a hollow calyx of one piece, and five petals. (This seems to be Tournefort's idea of a clove-like flower.)

Linnæan Genera.		English Names.	
<i>Agrostemina</i> ,	—	—	Campion, or wild Lychnis.
<i>Cucubalus</i> ,	—	—	Berry-bearing Chick-weed.
<i>Dianthus</i> ,	—	—	Clove-gilly-flower, or Carnation-pink.
<i>Drypis</i> .			
<i>Gypsophila</i> .			
<i>Lychnis</i> ,	—	—	Campion.

Saponaria,

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Linnæan Genera.

English Names.

<i>Saponaria,</i>	—	—	Soap-wort.
<i>Silene,</i>	—	—	Viscous Campion.
<i>Velezia.</i>			

S E C T I O N II.

Carnation-like plants with a calyx of more pieces than one, and five petals.

<i>Alfine,</i>	—	—	Chick-weed.
<i>Arenaria,</i>	—	—	Sandwort.
<i>Bufonia.</i>			
<i>Cerastium,</i>	—	—	Mouse-ear chick-weed.
<i>Cherleria.</i>			
<i>Glinus.</i>			
<i>Holosteum.</i>			
<i>Loeflingia.</i>			
<i>Moehringia,</i>	—	—	Mountain chick-weed.
<i>Polycarpon.</i>			
<i>Sagina,</i>	—	—	Pearl-wort.
<i>Spergula,</i>	—	—	Spurrey.
<i>Stellaria,</i>	—	—	Great chick-weed.

S E C T I O N III.

Carnation-like plants with a calyx of more pieces than one, and no petals.

<i>Minuartia.</i>
<i>Mollugo.</i>
<i>Ortegia.</i>
<i>Pharnaceum.</i>
<i>Queria.</i>

To this order have been annexed, somewhat improperly indeed, two other *genera*, which cannot be arranged under any of the foregoing sections. These are,

Polypremum, Carolina flax.

Scleranthus, German knot-grass, or knawel.

The former has a calyx of four pieces, and one wheel-shaped

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shaped petal ; the latter a hollow calyx of one piece and no petals.

Habit and Structure of the Plants of this Order.

All the plants of this order are herbaceous, and mostly annual. Some of the creeping kinds do not rise an inch ; and the tallest exceed not seven or eight feet.

The **ROOTS** are branched, fibrous, and of a moderate length.

The **STEMS** are cylindrical.

The **BRANCHES** proceed from the wings or angles of the leaves, and are generally opposite, and, as it were, jointed at each knot. In some species of *Cerastium*, the branches are square.

The **LEAVES** are generally placed opposite in pairs, so as to resemble a cross ; and are slightly united at the bottom, by their foot-stalks, which form a sort of glove round the stem.

In *Glinus*, the leaves surround the stalk in greater numbers in whirls, or whorls, (*verticilli*) ; and in a species of soapwort, mentioned by Mr. Adanson, they are placed alternate.

The **HAIRS**, (*Pili*) are simple, like silk.

The **FLOWERS** in this order are hermaphrodite ; that is, have their stamina and pointal, *pistillum*, within the same covers.

Lychnis dioica, *cucubalus otites*, and *gypsophila paniculata*, have male and female flowers upon distinct roots, and are, therefore, very improperly placed by Linnæus, in a class, which, according to his plan, should consist of hermaphrodite flowers only.

The **Flowers** either stand single on their foot-stalks, and proceed from the wings, or angles, of the leaves and branches ; or are disposed in a **SPIKE**, **CORYMBUS**, **UMBEL**, or **PANICLE**. *Vide SPICA, CORYMBUS, &c.*

The **CALYX**, or flower-cup, is permanent, and composed either of one piece with five indentments, as in plants of the first section ; or of four or five distinct leaves, as in those of the second and third. In clove-gilly flower, the base of the *calyx* is surrounded with four small leaves or scales, of which the two lower are opposite.

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The COROLLA in this order generally consists of five petals, which, in plants of the first section particularly, have claws of the length of the *calyx*; and a spreading limb, sometimes entire, but oftener cleft, or divided into two, as in *cucubalus* and viscous campion.

Several species of *lychnis*, *silene*, and carnation, are rendered double by culture.

Busonia; *sagina*; and mountain chick-weed, *moehringia*; have four petals: *polypremum*, but one, which is wheel-shaped, and has its limb, or upper part, deeply divided in four.

In *Drypis*, the jaws of the tube of the corolla, (*faux*;) are furnished with a set of small teeth, (*denticuli*); which serve as an essential mark in distinguishing the genus.

In viscous campion, *silene*, the neck of each petal is indented with two small teeth of the same kind, which crown the jaws of the tube, and distinguish that genus from *cucubalus*, to which it is otherwise very nearly allied.

These appearances are reduced by Linnæus under his general term NECTARIUM, which, by the way, includes every singularity in the flower, whether connected with the petals, as in the present instances, or not. *Vide* COROLLA and NECTARIUM.

The STAMINA are, in number, from three to fifteen, and of a moderate length. When their number is double the divisions of the *calyx*, as in *silene*, and most of the plants of the first section, they are attached alternately to the claws of the petals; those so attached, being shorter than the rest. The remaining stamina are inserted into the common receptacle, and stand opposite to the segments of the *calyx*.

Note. The *filaments* in german knot grass, *scleranthus*, are inserted into the *calyx*.

Cerastium pentandrum, and *spergula pentandra*, have only five stamina, as the specific name imports; although the genera *cerastium* and *spergula*, belong to a class in Linnæus's system, whose characteristic it is to have ten stamina. These species ought certainly to have been arranged as distinct genera, or as particular species of other genera in the class *pentandria*. But improprieties of this, and even of a worse kind,

kind, are very common in the sexual method of arrangement.

In some genera of this order, the number of stamina is found to vary, even in the different flowers of the same plant: thus chick-weed, *alsine*, has some flowers with ten stamina, though the greater number are furnished only with five.

The ANTHERS, or summits, are short, hemispherical, marked with four longitudinal furrows, frequently divided or cleft below, most commonly erect, sometimes, however, *incumbent*; that is, fastened to the filaments by the sides, as in *drypis*, and *lychnis*. *Loeflingia*, *bufonia*, & *glinus*, have twin-anthers, *anthera didyma*; that is, two anthers are placed upon each filament.

Note. The petals and stamina in this order, as well as the *calyx*, generally accompany the seed-bud to its maturity.

The POINTAL, (*Pistillum*,) is composed of a single SEED-BUD, which is generally roundish, sometimes cornered, supporting either one style, as in *loeflingia*; two, as in *bufonia* and clove-gilly flower; three, as in *mollugo*, *cucubalus*, and viscous campion; or five, as in *lychnis*, *agrostemma*, and *glinus*.

These STYLES are thread-shaped, of the length of the *stamina*, and crowned with a simple STIGMA, which is sleek or smooth externally, and slightly hollowed or vaulted within.

In some species of pink, *dianthus*, the two styles are much longer than the stamina; and the tops, or *stigmata*, are rolled back for the purpose of impregnation, according to the sexualists.

The SEED-VESSEL is a dry capsule, of an oval form, of the length of the *calyx*, and consists of one cell, as in clove gilly flower, *lychnis*, and soap-wort; or of three, as in viscous campion, and *cucubalus*.

The SEEDS are numerous, small, and generally kidney-shaped.

Note. *Drypis* has only one shining kidney-shaped seed.

The plants of this order are innocent in their quality; they

they abound in a watery sort of phlegm, and have bitter seeds.

With respect to their virtues, they are reckoned astringent, attenuating, and deterfive.

The seeds of *lychnis*, according to Dioscorides, were formerly applied as a proper remedy against the poisonous bites of serpents : and in modern times, physicians have used them with some success in preventing that putrefaction of the humours, which is apt to attend a continual use of spirituous liquors, particularly gin.

Burman relates in his *Theſaurus Zeylanicus*, that a particular species of Indian *Lychnis*, termed by the natives of Ceylon, Wisaduli, that is, pain-alleviating powder, is still used with efficacy, in counteracting the poison occasioned by the bites of venomous animals. For this purpose, the seeds reduced to a very fine powder, are sprinkled over the part affected, which never fails to remove the inflammation, and produce a speedy cure.

Officinal soap-wort is a most powerful resolver of obstructions formed by fat and viscid matter collected in the vessels and bowels. It provokes the *menſes*, and is used in the asthma and venereal disease. The Leaves are externally applied to hard tumours and whitloes. A decoction of the herb is used to cleanse and scour woollen-cloths ; and in some countries, the poor people use it instead of soap for washing, from which it derives its title.

The root of *Gypsophila fastigiata*, boiled with linen and woollen cloths, possesses a like cleansing quality : and hence, by Haller and other Botanists, this plant is ranked with the soap-worts.

The chick-weed of the shops, the *alsine media* of Boerhaave, grows in watery places, by the sides of hedges and paths. The herb is in use : it refrigerates and moistens, and has the virtues of pellitory of the wall, but has no astringency. It is reckoned nutritive, and therefore a wholesome food for persons in an atrophy, or consumption. The distilled water of chick-weed, or the infusion of it in wine, restores those who are emaciated after long diseases. The

root powdered, being laid on the piles, stops their immoderate flux, and assuages the pain. The juice is vulnerary, and cleansing, and employed with success in inflammations and pains of the eyes.

A species of *cucubalus*, called by Miller *cucubalus latifolius*, grows naturally in most parts of England, where it is generally known by the name of spatling poppy. It stands in the catalogue of medicinal plants, under the title of *Behen album*; the roots are sometimes used, and accounted cordial, cephalic, and alexipharmic.

Linnaeus relates in his *Flora Suecica*, that by the natives of Gothland, the leaves of *Cucubalus Behen*, or Bladder Campion, are applied externally with success in the Erysipelas.

The flowers of some species of *cucubalus*, and viscous campion, *silene*, are closed all day; but when the sun leaves them, they expand, and have a very agreeable scent. From this singular circumstance, such plants are termed *noctifloræ*, flowering in the night-time.

Alfine media wakes, that is, expands its flowers from nine in the morning to noon, unless rain fall. in which case it does not open that day. Next day, it droops, nor does it recover its erect position till a considerable time afterwards.

The flowers of *Arenaria rubra* open betwixt nine and ten in the morning, and close betwixt two and three in the afternoon.

A species of *Dianthus* (pink,) which grows naturally in European and Asiatic Turkey: is termed by Linnaeus *pomeridianus*, from the circumstance of its always opening its flowers at half-past twelve at noon. They generally shut at ten in the evening. *Vide Vigiliæ PLANTARIUM.*

An insect of the genus *chermes* of Linnaeus, which infests the flowers of clammy campion (*Cerastium viscosum*) often produces so remarkable a change, that the leaves of the calyx become thrice as large as in their natural state, and are inflated, with their tips bent inwards; the petals too become green, and are permanent.

In a species of *cucubalus*, called *gumsepungar* in Sweden, the

the flower-cup is curiously veined like net-work. That of our common fort is plain.

From the joints of the stalks of *cucubalus citratus*, there oozes a viscous clammy juice, which sticks to the fingers when handled, and hinders such insects as settle upon those parts of the stalks from getting loose again. The name of catch-fly has been given to a species of *lychnis*, and viscous campion, which possesses a glutinous quality of the same fatal effects to flies and other insects.

The leaves of a variety of common soap-wort, called *saponaria hybrida*, and generally esteemed a *lusus naturæ*, are hollowed like a ladle.

CASTRATIO, a term used by modern botanists, derived from the fancied analogy betwixt plants and animals. CASTRATION.

The castration of plants consists in cutting off the *anthers*, or tops of the stamens, before they have attained maturity, and dispersed the *pollen*, or fine dust contained within their substance. This operation has been frequently practised by the moderns, with a view to establish or confute the doctrine of the sexes of plants: the *anthers*, or tops, being considered by the sexualists as the male organ of generation.

The experiment of castration succeeds principally on plants, which, like the melon, have their male flowers detached from the female. In such as have both male and female flowers contained within the same covers, this operation cannot be easily performed without endangering the neighbouring organs.

The result of the experiments on this curious subject by Linnæus, Miller, Alston, and other eminent naturalists, may be seen under the article *Sexes of Plants*, whither we refer our reader. *Vide SEXUS.*

CATULUS, catkin. *Vide AMENTUM.*

CAUDEX, (*vel codex, proprie truncus arboris; sic dictus, says Vossius, videtur a caido sive cado, quia in plures secaretur tabulas crassas, quarum etiam contextus caudex propterea dicebatur*); by Malpighi and other botanists, is used to signify the stem or trunk of a tree: by Linnæus, the stock or body of the

the root, part of which ascends, part descends. The ascending part raises itself gradually above ground, serving frequently for a trunk, and corresponds, in some measure, to the *caudex* of former writers: the descending part strikes gradually downward into the ground, and puts forth radicles, or small fibres, which are the principal and essential part of every root. *Vide RADICULA.*

The descending *caudex*, therefore, corresponds to the *radix* of other botanists. *Vide RADIX.*

Agreeably to this idea, Linnæus considers trees and shrubs as roots above ground; an opinion which is confirmed by a well known fact; that trees, when inverted, put forth leaves from the descending *caudex*, and radicles or roots from the ascending. *Vide Phil. Bot. p. 38, 39.*

For the varieties in the structure of the descending *caudex*, see the article *RADIX.*

CAULESCENS *Planta*, (from *caulis*, the stem); having a stem or trunk, as most plants, opposed to *acaulis*. *Vide ACAULIS.*

CAULIS, (from *Καυλος*,) a stalk or stem; the first and most common species of trunk, defined by Linnæus, in his *Philosophia Botanica* to be the proper trunk of the *herb*, which elevates the leaves, flower, and fruit. *Vide HERBA.*

To this description may be added another circumstance, that *caulis* is an universal trunk; that is, proceeds immediately from the root: whilst the foot-stalks of the flower and leaf, which Linnæus likewise denominates trunks, are partial, that is, proceed from an universal trunk, or its branches.

The stalks of the grasses, palms, ferns, and mushrooms, being of a very singular nature, are distinguished by particular names.

For the different species of trunks enumerated by Linnæus, see the article *TRUNCUS.*

Note. The term *caulis*, which is now equally applied to herbs and trees, was formerly applied to herbs only: the terms *caudex*, *stipes*, and *truncus*, being used to denote the stem or trunk of trees and shrubs. *Vide CAUDEX, &c.*

A stem

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A stem is either simple or compound.

SIMPLE stems are such as do not divide, but proceed in a continued series towards their summits.

COMPOUND stems are subdivided into *ramuli*, or small branches, and diminish as they ascend, so as frequently to lose the appearance of a stem altogether.

Simple Stems.

These are either totally entire, *caules integri*; or send out small lateral branches, *caules ramosi*.

Simple undivided Stems.

In this manner, I have thought proper to translate the *caules integri* of Linnæus, as standing opposed to *caules ramosi*. I cannot, at the same time, help remarking, that Linnæus's explanation of this term, affords an instance of the great inaccuracy which still prevails in botanical language. In the *Philosophia Botanica*, he explains it by the word *simplicissimus*, and adds, *ramis vix ullis*; but in his *Delineatio Plantæ*, he gives us *simplicissimus* as a separate term; it should seem therefore, that *ramis vix ullis* belongs to *simplicissimus*; and to *integer*, *ramis nullis*, which sense I have given it. In Elmgren's *Termini Botanici*, revised by Linnæus, we have a new explanation of *caulis integer*, viz. *simplicissimus, ramis angustatis*; the former addition, *ramis vix ullis*, is transferred to the term *simplicissimus*.

Caulis Nudus, a naked stem, that is, devoid of leaves and hair. Linnæus, in his *Philosophia Botanica*, applies this term to such trunks as want the leaves alone; but as in the *Delineatio Plantæ*, and the *Termini Botanici*, he makes it a distinct term from *Aphyllus*, which, from its etymology, is expressive of the want of leaves, he must intend that it should imply entire nakedness, in opposition not to *foliatus* only, but also to *scaber*, *villosus*, *hispidus*, *setaceus*, and other terms importing roughness and pubescence. When applied to leaves, *nudus* is evidently taken in this sense.

Melon-thistle, dodder, burning thorny-plant, shrubby horse-tail, and *Stapelia*, afford instances of the naked stem alluded to.

Caulis

Caulis Foliosus, a stem covered with leaves; as in the corn-flag, and most plants; opposed to *aphyllus*, and the foregoing term.

Caulis Flexuosus, a stem which takes a different direction at every joint; as in rough bindweed, *smilax*; and shrub trefoil, *ptelea*.

Caulis Volubilis, a twining or winding stem; that is, which ascends spirally round the branch or stem of some other plant. The course of such stems is either to the left, according to the apparent diurnal motion of the sun, as in honey-suckle, hop, buck-wheat, and black bryony; or to the right, contrary to that motion, as in convolvulus, burning thorny-plant, Malabar night-shade, kidney-bean, and hemp-agrimony.

Caulis Reclinatus, bending in an arch towards the earth, as in the fig-tree.

Caulis Procumbens, lying along the ground, without putting forth roots; synonymous to *prostratus*, and exemplified in the lesser sea-bindweed, *convolvulus soldanella*.

Caulis Repens, a creeping stem, running along the ground, and striking root at certain distances; in which respect it differs from the foregoing term. It is exemplified in ivy, and the trumpet flower, *bignonia*.

Caulis Sarmentosus, (from *sarmentum*, a vine-twist). This species of stem strikes root as the former; but is almost naked, that is, without leaves, except immediately above each knot of *radiculæ*, or little roots, where a few leaves are produced in bunches.

Caulis Parasiticus, a stem not growing out of the ground, but supporting itself like a parasite on some other plant; as in vanilla, dodder, misletoe, and *tillandsia*.

Caulis teres, shaped like a cylinder.

Caulis anceps, two-edged, compressed and forming two opposite acute angles; as in *sifyrinchium*.

Caulis triqueter, having three plain or flat sides; as in *viola tricolor*.

Caulis triangularis, having three angles.

Caulis trigonus, having three angles, as the former, with the sides concave or convex.

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Caulis Sulcatus, furrowed, marked with deep grooves, or channels, through the whole length.

Caulis Striatus, from *stria*, (a slight or superficial groove); fluted, marked with slight, parallel channels, or grooves, through the whole length.

Caulis Glaber, having a smooth or even surface; opposed to

Caulis Scaber, rough, scabby, covered with small rigid projecting points, or tubercles.

Caulis Villosus, from *villus*, wool; hairy, or shaggy; covered with down, or soft hairs; woolly; as in sumach, *tomex*, and common furze, *ulex europæus*.

Caulis Hispidus, bristly, covered with stiff fragile bristles, or prickles, whose roots are only superficial, so as to be detached with the rind. *Vide ACULEUS*.

Note. The term expresses a great degree of roughness, and is exemplified in *brassica crucastrum*.

Simple Branching Stems.

Caulis Adscendens. The stem is so called when the branches grow first in a horizontal direction, and then gradually curve upwards.

Caulis Diffusus, diffused, that is, with spreading branches; as in the common water germander.

Caulis Distichus, (from *dis*, twice, and *στίχος*, a rank, or row); having the branches horizontal, and produced in two rows; in other words, when the branches all proceed from two sides of the stem only.

Caulis brachiatus, from *brachium*, the arm; having arms, branching in pairs, each pair standing at right angles with those above and below.

Caulis Ramosissimus, abounding with branches disposed without any regular order.

Caulis Fulcratus, from *fulcrum*, a prop. The stem so called, when supported by the branches which descend to the root; as in the fig-tree, and that curious aquatic, mangrove, the *rhizophora* of Linnæus.

Caulis Prolifer, shooting forth branches only from the

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center of the *apex*; as in the fir, pine, cedar, and larch trees.

Caulis Simplicissimus, most simple, having very few branches, and proceeding in a straight line up to its *apex*; exemplified in the *lathræa squamaria*.

The rest as in entire stems.

Compound Stems.

Caulis Dichotomus, (from *dis*, twice, and *τέμνω*, to cut); a forked-stalk; when the divisions are made by two and two; as in horned chickweed, *cerastium dichotomum*; and eastern soap-wort.

Caulis Sudivisus, divided into branches irregularly, or without order.

Caulis Articulatus, jointed; having knots or joints at certain distances; as in pepper and glass-wort.

The stem often furnishes essential marks of distinction. Thus many species of St. John's wort, lily of the valley, and French honey-suckle, are distinguishable only by the angles of the stem; and in the genus *lupinus*, the species are scarce to be known, except by the same part being simple or compound.

Observations on the reciprocal relations which subsist betwixt roots and stems are referred to the general head TRUNCUS, which see.

CEREALIA, from *Ceres*, the goddess of corn. Linnaeus's name for the larger esculent seeds of the grasses; these are rice, wheat, rye, barley, oats, millet, panic grass, Indian millet, *holcus*; *zizania*, and mays. To this head may be likewise referred darnel, *lolium*; which by preparation is rendered esculent. *Vide Phil. Bot.* p. 279.

CESPITITIÆ, from *cespes*, a sod, or turf; the name of a class in Sauvage's *Methodus Foliorum*, consisting of plants which have only radical leaves, that is, leaves proceeding from the root; such are the primrose, some species of leopard's-bane, sea-pink, aloe, garlic, crown imperial, narcissus, rhubarb, sow-bread, cuckow-pint, navel-wort, the lichens, and many others.

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This class in Sauvage's Method includes all those plants which have the species of trunk or stem called by Linnæus *scapus*. *Vide* SCAPUS.

CESPITOSA *Planta*, a plant so termed, which produces many stems from one root, thereby forming a close thick carpet on the surface of the earth.

Multitude or quantity, however, is merely an accidental circumstance in plants, and cannot furnish a true specific distinction, because subject to variation. Thus a plant which would naturally be disposed, in a proper soil, to produce several stems, with difficulty produces one in a lean and poor earth: on the contrary, there are circumstances which promote the growth of several stems from a single root, in plants which generally produce but one. *Vide* Phil. Bot. p. 216.

CESPITOSÆ *Paludes*, turf-bogs; a term of soil. *Vide* SOLUM.

CHARACTERES, marks or signs, characters. The description of the *Genera* of plants so termed by Linnæus; hence the *Generical Character* of any plant, and the *Definition of the Genus*, are synonymous terms.

The term *Character* is not extended by that author to the *species* of plants; because he never gives the complete description of any species; but only enumerates those characters or circumstances in which it differs from all the other species of the same genus. This observation sufficiently illustrates the different methods which are observed in the *Genera* and *Species Plantarum*. In the former work, all the parts of the flower and fruit, from which the characters of the genera are derived, are accurately and completely described; in the latter, such striking circumstances only of the stem, leaves, buds, roots, &c. are mentioned, as sufficiently distinguish the species in question from every other of that genus to which it belongs.

The same observation accounts for the appellations CHARACTERES and DIFFERENTIÆ, prefixed to two chapters or sections in the *Philosophia Botanica*: the former of which lays down rules for establishing the genera; the latter, the species.

In general, characters, or characteristical marks, according to the idea of systematic writers, are certain external signs obvious in the appearance of natural bodies, by means of which they are distinguished from one another. These signs being collected and expressed by proper words, lay the foundation at once for *definition*, *distribution*, and *denomination*, the three grand parts of practical botany.

The characters which are known by the sense of sight are only to be depended on in distinguishing bodies : those which are acquired by the other senses, as the taste and smell, being rarely or never to be admitted as marks of distinction.

The characteristic mark of each genus is to be fixed from the figure, situation, connection, number and proportion of all the parts.

Figure is the boundary of extension : in describing figure, therefore, let the boundaries be indicated by lines, and expressed by proper terms. For although, in ascertaining this property of bodies, accurate and geometrical dimensions cannot every where be obtained ; yet is figure principally to be attended to in this view. Figures, from resemblance to other bodies, are fallacious, and should be but sparingly used. Tournefort and Linnæus are faulty in this respect. Instances of such improper terms, will occur frequently in describing the parts, particularly the trunk and leaf. *Vide* CAULIS and FOLIUM.

Situation, or insertion, (*situs*,) expresses an order of co-existing things, without any respect to their continuity or contiguity to others. Thus leaves are said to be opposite or alternate in point of situation ; by which it is meant to express, not that the leaves are continuous or contiguous, for they are neither ; but that they stand in a certain relation of opposition, or alternation to each other. The parts being accurately defined, excellent characters may be deduced from this property ; as from the situation of the fins in fishes, and the various insertion of the stamina of flowers, into the calyx, petals, or receptacle.

Connection, (*nexus*,) expresses an order of co-existing bodies, respecting continuity and conjunction, by an immediate

mediate production of the constituent parts. The coalescence of the parts is necessary in this property of bodies. The union of the claws with the upper spreading part of the petals; of the anthers and filaments of the stamina; and of the toes in web-footed birds, furnishes examples.

Number expresses unity multiplied, or the relation of similar parts to unity. Examples of characters thence deduced, are found in almost every part of natural history; thus the divisions of the calyx, petals, *stamina*, and *styli* in flowers; the feet, toes, wings, fins, and teeth in various animals; are, with respect to number, no despicable foundations of generic distinctions.

Proportion respects the comparison of quantities; or, to speak more accurately, the quantity of any part compared with another in its neighbourhood. In the vegetable kingdom, examples may be adduced from the proportion of the petals between themselves; from the segments, (*laciniæ*,) of the calyx, compared to those of the petals; from the stamina and petals, or stamina and styli: in the animal kingdom, from the proportion of the head and tail to the body, or of the wings and fins to one another.

Any part of a body considered either in itself, or with relation to others, is found to possess all the properties just enumerated. Characters, therefore, may be drawn from all the parts, to define the difference of bodies; thus the leaf, stem, flower and its parts in plants; the foot, wing, fin, in animals; all differ in their figure, situation, number, and proportion, and exhibit characters proper for distinction.

Experience shews that one part or property of a part varies more than another; in constituting a method, therefore, those parts and properties are to be selected, which vary least. Thus the parts of flowers in vegetables, the feet, fins, beaks, in animals, are more fixed with respect to the above-mentioned properties. Again, the figure and number of these parts are more apt to vary than their situation, connection and proportion; the characters, therefore, are, if possible, to be taken from these last.

In arranging natural bodies, nothing creates such confu-

sion as the great variety which yet is so expressive of the Creator's omnipotence and wisdom. The fact is, various bodies, every way limited in their essential properties, are subject to change from occasional causes, in other properties less essential. Hence the enquirers into nature should give particular attention to all the properties of bodies, and select from them the most constant for scientific distinction.

The great number of bodies to be investigated requires, that, in distinguishing them, we should collect many characters; that from these placed in proper subordination, we may lay the foundation of the differences and agreements of bodies.

Before the invention of regular systematic methods, distinctive characters were derived from all the parts of plants indiscriminately; a circumstance which sufficiently explains the confusion that long obtained in botany, as well as the slow advances of the science. It was not till the distribution into classes, genera and species became an object of attention, that rules were established for fixing with precision the parts, whence characters could most commodiously be drawn.

Tournefort, who, in 1694, gave the first and most perfect model of this distribution, has made no division of the characters in question. Dr. Linnæus is the first who suggested four sorts; the factitious, accidental, or artificial character, *character factitius*; the essential; the natural; and the habitual;—which are all equally applicable to the higher and lower divisions.

Artificial Character.

The artificial character, otherwise called accidental, and by Linnæus, factitious, is drawn indiscriminately from different parts of the plant, and admits of fewer or more characteristic marks than are absolutely necessary for distinguishing the classes, genera, and species.

Linnæus, who particularly applies all the characters just enumerated, to the distribution of the genera, establishes
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for a criterion of the artificial character, that it can never distinguish the genera in a natural order; being calculated merely for discriminating such as arrange themselves under the same artificial order.

To the head of artificial characters is referred, by Linnæus the description of the genera, in the methods of Tournefort, Ray, Rivinus, Boerhaave, and most of the other systematic botanists.

The classical characters only, in the sexual method, are deemed artificial: the generical, as exhausting the description of the parts of fructification, its author considers as true natural characters: with what propriety will be seen below.

Linnæus's idea of an artificial character is well expressed by Ray, when he says, That no more characteristical marks of the genera are to be collected, than are found absolutely necessary for determining the genus with certainty and precision.

Essential Character.

The essential character discriminates one plant from another, by means of a single mark, so striking and particular, as to distinguish the plant in which it is found, from every other at first sight. It serves, says Linnæus, to distinguish such genera as arrange themselves under the same natural order.

The essential character of the classes and genera, by the consent of all the modern systematic botanists, ought to be drawn from one of the seven parts of fructification; that of the species from any of the other parts, as the stem, leaf, root, buds, &c. In the following species of Linnæus, the essential specific characters are very improperly taken from the parts of fructification:

Tamarix floribus pentandris, tamarisk with five stamina.

Tamarix floribus decandris, tamarisk with ten stamina.

Spergula pentandra, spurrey with five stamina.

Salix floribus diandris, willow with two stamina.

Salix triandra, willow with three stamina.

Salix pentandra, willow with five stamina.

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Valeriana floribus monandris, valerian with one stamen, or male organ.

Valeriana floribus diandris, valerian with two stamina.

Verbena diandra, vervain with two stamina.

Dryas pentapetala, dryas with five petals.

Dryas octopetala, dryas with eight petals.

Tilia floribus nectario instructis, lime-tree whose flowers are furnished with a nectarium. *Vide* NECTARIUM.

Tilia floribus nectario destitutis, lime-tree whose flowers want a nectarium.

Delphinium nectariis monophyllis, lark-spur with a nectarium of one leaf.

Delphinium nectariis diphyllis, lark-spur with a nectarium of two leaves.

Delphinium nectariis tetraphyllis, lark-spur with a nectarium composed of four leaves.

Papaveres capsulis hispidis, poppies with bristly capsules, or seed-vessels.

Papaveres capsulis glabris, poppies with smooth capsules.

Delphinium unicapsulare, lark-spur with one seed-vessel.

Delphinium tricapsulare, lark-spur with three seed-vessels.

Nigella pentagyna, fennel-flower with five styles.

Nigella decagyna, fennel-flower with ten styles.

Hypericum floribus pentagynis, trigynis, & digynis, St. John's-wort with five, three, and two styles.

Beautiful as these specific distinctions from the parts of the fructification frequently are, they must be allowed to be highly improper and inmethodical; as, by making the same parts characteristical of the classes, genera and species, the illustrious author confounds the higher with the lower divisions, and thus falls into the very error, which he himself has been at such pains to expose.

In apology for so remarkable a deviation from his own principles, Linnæus tells us, that, though he once imagined, that, as the flower was of short duration, and its parts commonly very minute, recourse should not be had to the fructification for specific differences, till all other ways had been tried, and found ineffectual; yet, upon a stricter at-

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tention to the subject, he was inclined to recant that opinion, as the fructification contains more distinct parts than all the rest of the plant taken together; and certainty throughout nature, is found most commonly to obtain in her minutest parts. *Vide Phil. Bot.* p. 222.

I shall make no further comment upon this observation, than by remarking, that several of the species above enumerated, as well as many others in the Linnæan method of arrangement, might, with as great propriety, be denominated genera, and removed into different classes and orders, as many old genera, which were not established on the fructification, are rejected by the sexual system, and converted into species.

The excellence of the essential character consists in its brevity.

Natural Character.

This character includes the two former, and collects all the possible marks of plants. It is useful, says Linnæus, in every method; lays the foundation of the systems; remains unchanged, although new genera be daily discovered; and is capable of emendation by the detection of new species alone, which afford an opportunity of excluding such characteristical marks as are totally superfluous. He adds, that the *Genera Plantarum* first introduced these characters into the science.

Botanists, from the time of Gesner, who established the distribution into genera and species on rational principles, have been greatly puzzled in determining from what parts of the plant, classic, generic, and specific characters might most commodiously be drawn.

Before we examine their opinions on this subject, it will not be improper to observe, that what they have said of characters in general, may, with sufficient propriety, be referred to the head of natural characters, which we are now considering.

Conrad Gesner, a physician of Switzerland, was the first, who, in 1560, suggested the idea of establishing generic characters from the parts of the fructification; I mean, from the flower, fruit, and seed: a principle so much the more

just, as these parts being destined for the reproduction of the plant, must necessarily be most constant, and general. And yet, till the time of Gesner, the roots, leaves, or flowers alone had engaged the attention of enquirers into nature. In one of his letters to Zwinger, he thus expresses himself: "Ex his enim, (fructu, semine & flore) potius quam foliis, stirpium naturæ et cognationes apparent." And in another letter to Occon: "Melissa Constantinopolitana ad Lamium vel Urticam mortuam quodammodo videtur accedere; seminis tamen, unde ego cognationes stirpium indicare soleo, figura differt."

In 1694, Tournefort, who introduced into the science order, purity, and precision, availed himself of Gesner's idea for establishing the genera. Generical characters, according to this illustrious botanist, are to be drawn from all the parts of fructification, if necessary; if unnecessary, from the most essential. If all the parts of fructification should not sufficiently distinguish any particular genus, recourse is then to be had to auxiliary characters from the other parts of the plant, and even from their virtues and sensible qualities. The genera formed from the parts of fructification alone, were called primary genera, or genera of the first order; those formed from any of the other parts combined with the fructification, were styled subaltern genera, or genera of the second order. See the article GENUS.

In short, Tournefort, as well as Ray, proceeded upon this principle, neither to multiply characteristical marks without necessity; nor, on the other hand, to be so limited to a particular part of the plant, as at any time to incur the danger of sacrificing accuracy to uniformity, or precision to elegance.

Heister, in a dissertation *de Foliorum Utilitate*, printed at Helmstadt, in 1731, is of opinion, that the leaves furnish essential marks for characterising the genera of plants. Tournefort had advanced the same thing in the preface to his institutions. His words are, "situs numerusque foliorum plurimum faciunt ad generum distinctionem; ut fragariæ folia terna, &c." *Isagoge*, p. 60.

In 1735, Dr. Linnæus, afterwards professor of botany at Upsal,

Upsal, in Sweden, preferring uniformity to precision, proceeded to arrange the genera upon a new principle; and, notwithstanding the lights which he must have received from the ingenious researches of Gefner, Ray, Tournefort, and other eminent botanists who preceded him, is not ashamed to arrogate to himself the chief, nay, the sole merit of establishing the genera upon a sure and unshaken foundation.

The generical characters, according to Linnæus, are to be drawn from all the parts of the fructification, and in no case, be it ever so necessary, from any other. Upon this principle, so different from that of every former botanist, does the *Genera Plantarum* proceed: a book, which, although executed in a masterly manner, and with the most astonishing accuracy, has, I think, contributed very little to the progress of the science. This assertion will not appear extravagant, if it is considered that, accurately determined as the Linnæan Genera are, they have cast a thick cloud over all the labours and ingenious enquiries of the very men to whom the science is most indebted. The genera of Ray, Tournefort and Boerhaave, are now no more. Established upon other principles, they are either swallowed up in more extensive genera, and dwindle into mere species; or they are split, and become numerous genera instead of one. The names too, are frequently changed, without necessity: in short, such is the transformation, that there are very few of the Linnæan genera which agree in every thing with corresponding genera in Tournefort, or Ray.

Linnæus calls his generic characters natural; and adds, that he was the first who introduced them into botany. “Ego primus, (says he) hos characteres composui;” again, “*Genera mea Plantarum* promunt characteres naturales.” *Phil. Bot.* p. 130. And in the preface to his *Genera*, section 18, “Naturales itaque hic trado Characteres qui notas omnes in fructificatione obvias et communes exhibent; tales ante me, quantum novi, dedit nullus.”

A character of this kind, continues the same author, is applicable to every method that has been, or shall be invented; and affords a foundation both to the old and new systems

that are established upon the parts of the fructification; viz. the calyx, petals, *stamina*, *pistillum*, or fruit. The discovery even of a thousand genera, does not render it necessary to make the slightest alteration in the next natural genus, by the addition or diminution of a single character.

These and many other properties of the natural character enumerated by Linnæus, are true. But was he the first that introduced this character into botany? I readily allow, that the principle of establishing the genera from all the parts of the fructification, and none other, was never uniformly adopted by any former systematic writer. We have seen, however, that Ray and Tournefort, occasionally adopted it; nay, never transgressed it, but with a view to avoid superfluous characters, or imperfect descriptions. In fact, what has Linnæus added to Tournefort's generical characters of the passion-flower, burnet, the willow and poplar-trees, and many others, in which the latter has given accurate and full descriptions or figures of all the parts of fructification? It is true, he insists less than Linnæus on certain parts, as the number of *stamina* in the above mentioned plants; the calyx and seeds in others: such parts in his idea, being not only less essential, but even superfluous for establishing the character of the genus.

Nor is Tournefort the only botanist prior to Linnæus, whose generical characters exhaust the description of the parts of fructification. Many genera, in Boerhaave, are of the same kind.

Again, Linnæus's characters are by no means applicable to a natural method, which, in ascertaining the genera of plants, is not confined merely to the parts of fructification. Thus in certain tribes or families, as the pea-bloom flowers, the leaves furnish the most essential marks; and in others, as the gaping, or masqued tribe, *ringentes*, the disposition of the flowers. In fact, these characters cannot be applied to every artificial method, but to such only as are established on the parts of the flower and fruit; nor do I think that in these they are always sufficient for ascertaining the genus, without calling in some other characters to their assistance.

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The natural character of the species of plants ought, according to Tournefort, to be drawn from all the parts which are unconnected with the fructification, as the root, stem, and leaves; likewise from their sensible qualities, as colour, taste and smell.

To the former part of this aphorism Linnæus cheerfully subscribes, but not to the latter. The duration of plants, their colour, place of growth, time of flowering, and other qualities which are not obvious in their appearance, are rejected by the sexual system as very improper specific distinctions, and referred to the head of varieties, to which they more properly belong. If Linnæus has corrected one error in thus refusing to admit the sensible qualities of plants into the number of genuine specific distinctions, he has committed another no less dangerous, by having recourse to characters from the parts of the fructification, which he advises to adopt, when they do not interfere with those of the class and genus. Examples of this impropriety may be seen above.

Character drawn from the Habit or Port of Plants.

This character was the invention of the earlier botanists, who knew no better rule for the distribution of vegetables. It is drawn from the external face or general conformation of plants, considered with respect to the result of all their parts, their manner of growth, the disposition of the branches and leaves; in short, all the relations which approximate plants, or remove them from one another.

The character of the habit, although quickly discerned, and easily recalled by the memory, has never been employed but in distinguishing the species. Linnæus seems to think, that it may be used, with caution, and in default of other characters, for ascertaining the genera; and M. Gouan, in his *Hortus Monspeliensis*, has usefully adopted it under the name of secondary character.

As among quadrupeds, ferocious animals, such as the bear, and lion, are distinguished at first sight, from the sheep, bull, camel, and other *pecora*, without inspecting their teeth
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by which they are artificially arranged : so many natural orders of plants may be distinguished from one another by their habit or external face, without having recourse to any artificial or partial characters whatever.

An expert botanist, says Linnæus, can easily distinguish the plants of Africa, Asia, America, and the Alps, from each other, by their habit and external face, without being able to assign the causes or characteristic marks of such distinction. Thus the plants of Africa have a certain stern, dry, obscure appearance ; those of Asia are proud and towering ; the American plants have a smooth agreeable aspect ; those of the Alps appear hardy and vigorous.

From what has been said of classic, generic, and specific characters, they appear to be highly arbitrary and variable. So far, indeed, from being fixed on an unshaken foundation, they are subjected to the caprice of every systematic botanist, who may regard as accidental, or arbitrary, what others consider as true, natural and essential characters.

I conclude with laying down Linnæus's arbitrary principles on this head. These establish that the characters of the class are to be taken from one part of the fructification : those of the genus, which he calls his natural characters, from all the parts of the fructification, and none other : those of the species, from all the other parts, as the root, trunk, leaf, buds, and habit ; nay, even from some circumstances attending the parts of fructification, if they do not enter into the character of the genus or class.

CHRONICI, from *χρονος*, time. By this name Linnæus denominates a class of early botanists, who arranged all plants from their time of flowering.

CICHORACEUS *Flos*, from *cichorium*, succory ; a flower like succory, or endive. The term is used by Vaillant, and is synonymous to the *planipetalus* of Ray and Boerhaave, the *semiflosculosus* of Tournefort, the *lingulatus* of Pontedera, and the *ligulatus* of Linnæus. *Vide* LIGULATUS, &c.

CICHORACEI, the name of a class in Cæsalpinus's system, and of Vaillant's arrangement of the compound flowers, consisting

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consisting of plants whose flowers, like endive, are composed of several lesser flowers, which are hollow at the base only, flat in the middle, and expanded towards the top. Of this sort are dandelion, hawk-weed, nipple-wort, viper's-grass, and several others.

CIRCULATIO *humorum seu succi*. Circulation of the humours, or sap in plants.

The curious controversy in philosophical botany, respecting the descent of the sap, is fully discussed under the article **SUCCUS**, which see.

CIRRUS, (*capillus quasi in circum tortus*,—curled or frizzled hair,)—a clasper, or tendril; that fine spiral string or fibre, put out from the foot-stalks, by which some plants, as the ivy and vine, fasten themselves to walls, pales, or trees for support.

The term is synonymous to the *capreolus*, *clavicula*, and *viticulus* of other botanists, and is ranked by Linnæus among the *fulcra*, or parts of plants that serve for support, protection, and defence. *Vide FULCRA*.

Tendrils are sometimes placed opposite to the leaves, as in the vine; sometimes at the side of the foot-stalk of the leaf, as in passion-flower; and sometimes, as in the winged-pea, *pisum ochrus*, they are emitted from the leaves themselves.

With respect to composition, they are either simple, that is, composed of one fibre or chord, as in the vetch; or compound, that is, consist of two, three, or more, as in the everlasting pea.

Bitter-sweet, *solanum dulcamara*; *bignonia*, and ivy, send forth tendrils which plant themselves like roots in the adjacent walls, or the bark of the neighbouring trees.

Claspers, says the ingenious Dr. Grew, are not like trunk roots, a mean betwixt a root and a trunk, but a compound of both, as may be gathered from their circumvolutions, in which they mutually ascend and descend.—In the mounting of the trunk, continues the same author, claspers serve for support. Thus in vines, the branches being very long, fragile and slender, would be liable to frequent breaking, unless, by means of their claspers, they were mutually con-
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tained together; so that the whole care is divided betwixt the gardener and Nature: the former, with his ligaments of leather, secures the main branches; and Nature, with those of her own providing, secures the less. Their aptitude to this end is seen in their convolutions, a motion not proper to any other part: and also in their toughness, which is so much the more remarkable, as they are slenderer than the branches from which they proceed.—In the trailing of the trunk, tendrils serve for stabiliment and shade. Thus in cucumbers, the trunk and branches being long and fragile, would be driven to and fro by the winds, to the great prejudice both of themselves and their tender fruits, were they not by these ligaments held fast together, and preserved in good association and fellowship. The same claspsers serve likewise for shade: so that a natural arbour is formed by the branches of the cucumber, in the same manner as an artificial one is made by tangling together the twigs of trees; for the branches, by the linking of their claspsers, being couched together, the tender fruits lie under the umbrage of a bower made of their own leaves.

Most of the pea-bloom flowers have twining claspsers, that is, which wind to the right and back again.

CLASSIS, a class; the first and highest division in every method; defined by Tournefort to be a collection of *Genera* which have some striking mark in common; and by Linnæus, the agreement of several *Genera* in the parts of the fructification, according to the principles of nature, distinguished by art. This primary division is very aptly illustrated by the manner in which a dictionary is compiled; there all the words, which have the same initial letter, arrange themselves together, as it were, under one class: each particular word being a distinct genus of that class. The classic character then is constituted from a single circumstance, as the initial letter in question which is found to be possessed equally by all the words in that division, how different soever they are in other respects.

The ancient botanists knew neither methods, systems, nor classes; they collected in chapters, or in sections, those plants,

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plants, which appeared to them to resemble each other in the greatest number of relations. It is in this manner that Theophrastus, Dioscorides, and other authors, who are considered as systematic botanists, have arranged vegetables.

The single mark which characterizes the class is arbitrary; and therefore different in different systems. In Tournefort, the petals; in Ray, the fruit; and in Linnæus, the stamina, furnish classic artificial characters.

Classes are subdivided into sections or orders, and distinguished, like systems, into natural and artificial. The umbelliferous, compound, pea-bloom, and cross-shaped flowers seem to prove that there are true natural classes. *Vide Phil. Bot.* p. 100.

Some artificial methods retain a few of the natural classes; others preserve none. In general, that method is to be preferred, which collects the greatest number of such classes. Whenever a class, or part of a method, is demonstrated to be false, that method cannot be natural; it is artificial.

Modern botanists having established as an axiom, that the characters of the class may be drawn from any of the parts of fructification, were determined in their choice by the real, or supposed constancy of a particular part. Thus Tournefort's system, as we have said, is founded upon the structure, figure, and other circumstances of the petals: that of Magnolius, on the calyx; those of Ray and Boerhaave, on the fruit; that of Sigesbeck, on the seeds; and that of Linnæus, upon the stamina. The pistil, although as uniform and constant as any of the other parts, has never yet been employed as a classic distinction: Linnæus chiefly uses it as the foundation of his secondary divisions or orders, as Tournefort does the fruit, because it generally succeeds the petals, which furnish his classic characters.

Tournefort was the first who demonstrated that the parts of the fructification in plants were preferable to all the other parts for establishing the classes. These last, however, he does not absolutely exclude: on the contrary, he admits them, whenever the other characters are insufficient. Linnæus has followed Tournefort's principle in all its rigour,
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and pretends that the classic characters ought to be taken from the parts of fructification, and none other.

From this diversity of opinion, with respect to the most essential parts of the plant, or of the fructification, for establishing a system, have arisen the dissensions among systematic writers, who, misunderstanding the extent of the principle in question, have framed a multiplicity of methods, each of which is regarded by its founder, as the most universal, most easy, and most natural that had hitherto appeared. But how can those methods be natural, which contain few or no natural classes? Or how can the principles upon which such classes proceed, be regarded in any other light than as arbitrary and hypothetic?

The excellence, or defect, of the classic character consists, says Linnæus, in its greater or less approximation to the natural one. Natural classes are such as agree in their habit, manner of growth, virtues, uses and sensible qualities. Such are the grasses, the compound, umbelliferous, pea-bloom, cross-shaped, and verticillated flowers, the ferns, and some others.

CLAVICULA, (diminutive from *clavis*, a key; used by Cicero for the tendril of a vine, wherewith it takes hold of any substance, and climbs up by it,)—a clasper, or tendril. The term is employed by Tournefort, Ludwig, and the ancient botanists. Linnæus has substituted CIRRUS, which see.

CLAVUS, (properly a nail,—used by Celsus for any horny appearance, as a corn in the toe or elsewhere,—) a species of disease, to which the grains of many grasses, particularly those of rye, are incident. *Vide* VARIETAS.

CLIMA, a climate; a part of the surface of the earth, bounded by two circles parallel to the equator.

Different climates, as well as different soils, rarely produce plants of the same species. This subject is curious, and, considering its importance to gardening, well deserves the attention of every botanist.

The numerous species of plants, which grow betwixt the North Pole and the Equator, when viewed in detail, appear

to differ from each other only by insensible degrees : yet are the plants of the frozen zones, when viewed *in cumulo*, totally different from those which are produced betwixt the tropics. Thus we often see whole families of plants natives of the torrid zone, which are never to be found in any of the others.

In the climate of plants, says Linnæus, are to be considered latitude, longitude, and the temperature or elevation of the soil. Vaillant was among the first who viewed the *loci natalia* of plants in this light ; but his observations were confined to latitude alone.

Places situated under the same parallel of latitude, but in opposite hemispheres, produce plants that are totally different ; even those in the same hemisphere are rarely alike. Thus Rome, Pekin, and New York in America, are situated almost in the same degree of north latitude, yet produce very different plants. The same may be said of the plants of Florida and Palestine, the Cape of Good Hope, and Chili in South-America : places which exactly correspond in latitude ; the two former situated in the northern hemisphere ; the latter in the southern.

What has been affirmed of latitude, may likewise be asserted of places that are situated upon the same meridian. Thus the North Cape, Rome, Upsal, and the Cape of Good Hope, agree in longitude, yet produce plants that are totally different.

The aptitude, however, of plants to grow in certain climates, and not in others, seems to depend not so much upon longitude and latitude, as upon the elevation of the soil, or difference of temperature in such climates. From this cause principally proceeds the difference which is generally found to obtain betwixt the plants of the torrid, and those of the temperate and frigid zones. For when in the torrid zone we find mountains, which, by their elevation, have acquired a temperature similar to that of the temperate or frigid zones, we always discover on such mountains the same, or, at least, a part of the same, plants. Thus the plants on the mountains of Lapland, of Switzerland, Greenland, Siberia, Wales,

the

the Pyreneans, Olympus, Ararat, the Andes, and those of Brasil, though placed at such immense distances from each other, are nearly the same.

Again, as at a certain depth, the temperature of water is found to be nearly the same in all climates: the greatest part of aquatic plants are common to the torrid, temperate and frigid zones. Thus the water-lily, *aldrovanda*, sun-dew, arrow-head, water-milfoil, and many other aquatics, are equally natives of Europe and the Indies.

As culture, so climate, has a mighty tendency to change the texture and external appearance of plants. Thus the same plants which, under an inclement, rigorous atmosphere, are covered, or crusted over with a thick coriaceous skin, shall, in more indulgent skies, exhibit no such appearance, but be perfectly smooth.

COADUNATÆ, (*coadunare*, to join, or gather together). The 52d order of plants, in Linnæus's Fragments of a Natural Method, so termed, as I imagine, from the general appearance of the seed-vessels, which are numerous, and being slightly attached below, form altogether a single fruit in the shape of a sphere or cone, the parts of which, however, are easily separated from one another.

The Genera contained in this Order are six: viz.

Linnæan Genera.

English Names.

Annona.

Liriodendron, — — The Tulip Tree.

Magnolia, — — Laurel-leaved Tulip Tree.

Michelia.

Uvaria.

Xylopia.

Habit and Structure of the Plants of this Order.

This family of exotic plants furnishes as beautiful and choice a collection of shrubs and trees, both evergreen and deciduous, as is to be found in the whole vegetable kingdom. The trees are often sixty feet high, and garnished from the
bottom

C O A

bottom to the top with spreading branches and leaves of a bright green colour, which assume a very agreeable conic form.

The **ROOTS** are branched and fibrous.

The **STEMS** cylindric.

*The **WOOD** very hard.

The **BUDS** conic, flat, and generally naked, or without scales.

The **LEAVES** are universally simple, and alternate. The foot-stalk is cylindric, without furrows, frequently swelled at its origin, and appears jointed at its insertion into the branch.

In the magnolias, and tulip-trees, two very large *stipulae*, or scales, are attached to the branches near the origin of the foot-stalk of the leaves; but these fall soon after the leaves are expanded. *Vide STIPULA.*

The **FLOWERS** are hermaphrodite, that is, have both *stamina* and pistil within the same covers; and are generally produced either along, or at the end of, the branches.

The **CALYX** generally consists of three oblong plain leaves like petals, which fall off with the flower. The tulip-tree, besides a flower-cup of three leaves, has likewise an external *involucrum*, or cover, composed of two triangular leaves, which fall away in like manner as the others.

In *xylopia*, the calyx consists of one leaf; in *uvaria*, it is permanent, that is, accompanies the seed-bud to its maturity.

The **PETALS** are in number, from six to eighteen, oblong, concave, and frequently disposed in two or three series or rows, the outermost of which are largest.

The **STAMINA** are numerous, short, and inserted into the common receptacle in the five first genera; into the *germen*, or seed-bud, in the sixth; a circumstance, which removes that genus to the class *Gynandria* in the sexual method; whilst the other genera, from the indefinite number of their *stamina*, are reduced to the class *polyandria* in the same method. *Vide GYNANDRIA, and POLYANDRIA.*

The **FILAMENTS**, or threads of the *stamina*, are very short

C O A

short and slender; *uvaria*, *xylophia*, and the custard-apple, have scarce any filaments at all.

The ANTHERS, or tops, are numerous, slender, and placed round the seed-bud; in *xylophia*, they are seated upon it.

The PISTIL, or pointal, generally consists of a number of seed-buds, disposed in the form of a cone, and seated upon a receptacle, which rises like a small pillar above the receptacle of the calyx. Custard-apple, and *xylophia*, have only one roundish seed-bud.

From each seed-bud generally arises a cylindric style, which is very short, and in *magnolia* bent backwards.

The tulip-tree, *michelia*, and the custard-apple, have no style.

In *xylophia* it is of the length of the petals.

The STIGMA, or top of the style, is commonly blunt, and in *michelia*, bent backwards.

Magnolia has a hairy stigma placed along each style.

The SEED-VESSEL is commonly a berry; in *magnolia* it is an oval cone, consisting of a number of roundish capsules, laid over one another like tiles. The fruits, or seed-vessels, whether of the berry, capsule, or cherry kind, are equal in number to the seed-buds, and generally slightly attached below.

In the tulip-tree there is properly no seed-vessel; the seed-buds, in the progress of vegetation, become so many naked seeds, which lie over one another like the scales of fish, and form the appearance of a cone.

The SEEDS, in this order, are generally numerous, hard, roundish, and sometimes cornered. In the *magnolias*, each capsule contains a single kidney-shaped seed, of the nature of a berry, which, when ripe, is discharged from its cell, and hangs by a slender filament, or thread.

In *xylophia*, the seed is a stone, the fruit being of the cherry kind.

The seeds of the tulip-tree are winged. *Vide ALA.*

The plants of this order have a strong, agreeable, and aromatic smell; the fruits and seeds have a pungent taste, like pepper. The bark and wood are bitter.

C O A

The berries are esculent, particularly those of *annona*, some species of which have an exquisite and very delicate taste.

None of these plants, as far I can learn, (four-top, a species of *annona* excepted,) have ever been used in medicine; but for beauty and ornament, they yield to no tribe or family whatever, on which account they have of late years been cultivated with great care in this country.

The tallest *magnolia* is a native of Florida, and South-Carolina, where it rises to the height of eighty feet, and upwards, with a strait trunk of two feet diameter, and a regular head; the leaves resemble those of the common laurel, but are much larger; they are of a shining green on their upper surface; of a russet, or buff-colour on their under, and continue all the year: so that this is one of the most beautiful ever-green trees yet known.

The leaves of the *magnolia tripetala* are very large, and produced in horizontal circles somewhat resembling an umbrella; from which circumstance, the inhabitants of Virginia and Carolina, where it grows naturally, have given it the name of umbrella-tree.

The tulip-tree, termed by Linnæus *liriodendron*, from the fancied resemblance of its flowers to those of the lily, and by other botanists, *Tulipifera*; is a native of North-America, where it grows to be a tree of the first magnitude, and is generally known through all the English settlements by the title of poplar. Of late years, a great number of these trees have been raised from seeds in the English gardens; so that they are now become common in the nurseries about London. The first of the kind which flowered in England, was in the gardens of the late earl of Peterborough, at Parson's-Green, near Fulham. There is a very beautiful tulip-tree which flowered last summer, (1769)* in the garden of Waltham-Abbey; and at Wilton, the seat of the earl of Pembroke, there are some trees of great bulk. The flowers, which are produced at the end of the branches, consist of six petals, in two rows, which form a sort of bell-shaped

* The first edition of the Botanical Dictionary was published in 1770.

C O L

flower, whence the North Americans gave it the name of tulip.

Some of these trees, says Catesby, in his Natural History of Carolina, are thirty feet in circumference, with unequal and irregular boughs, which distinguish them at a distance, even when they are stript of their leaves. Their timber is of great use in their native soil, particularly for making that kind of boats called periaugues.

The custard-apple, a species of *annona*, derives its name from the texture of the fruit, which, when ripe, is of an orange colour, with a soft, sweet, yellowish pulp, of the consistence of a custard.

North American *annona*, is called by the inhabitants papaw-tree.

The fruit of Soortsak, Zuurfak, or four-fop, the *annona muricata* of Linnæus, is shaped like a heart, but somewhat longer, and generally bends towards the point. The outside is of a glaucous green, studded here and there with soft-pointed prickles. The inside is a soft pulpy substance, which is eaten, and looked upon to be a good cooler in fevers.

The leaves of most species of *annona* being rubbed, emit a strong agreeable scent.

COLOR, colour; an attribute, or sensible quality, which, in plants, is found to vary, not only in different individuals of the same species, but likewise in different parts of the same individual. Thus marvel of Peru, and sweet-william, have frequently petals of a different colour, on the same plant.

Three or four different colours are frequently found upon the same leaf, or flower: as on the leaves of the *amaranthus tricolor*, and the flowers of the tulip, auricula, three coloured violet, and others. To produce the most beautiful, and striking variety of colours in such flowers, is the principal delight and business of the florist.

The primitive colours, and their intermediate shades or gradations, enumerated by botanists, are as follows.

Water-colour, *hyalinus*.

WHITE, *albus*.

Lead.

C O L

Lead-colour, *cinereus*.

BLACK, *niger*.

Brown, *fuscus*.

Pitch-black, *ater*.

YELLOW, *luteus*.

Straw-colour, *flavus*.

Flame-colour, *fulvus*.

Iron-colour, *gilvus*.

RED, *ruber*.

Flesh-colour, *incarnatus*.

Scarlet, *coccineus*.

PURPLE, *purpureus*.

Violet-colour, *cæruleo-purpureus*.

BLUE, *cæruleus*.

GREEN, *viridis*.

These colours seem to be appropriated to particular parts of the plant. Thus white is most common in roots, sweet berries, and the petals of spring flowers. Water colour, in the filaments and styles. Black, in the root and seeds; rarely in the seed-vessel, and scarce ever to be found in the petals. Yellow is frequent in the anthers, or tops of the stamina; as likewise in the petals of autumnal flowers, and the compound ligulated flowers of Linnæus. *Vide LIGULATUS Flos*.

Red is common in the petals of summer-flowers, and in the acid fruits. Blue and violet colour, in the petals. Green, in the leaves and calyx, but rarely in the petals.

In the interchanging of colours, which in plants is found to depend upon differences in heat, climate, soil and culture, a sort of elective attraction is observed to take place. Thus red is more easily changed into white and blue; blue into white and yellow; yellow into white; and white into purple.

A red colour is often changed into a white, in the flowers of heath, mother of thyme, betony, pink, viscous campion, *cucubalus*, trefoil, orchis, fox-glove, thistle, cudweed, saw-wort, rose, poppy, fumatory, and geranium.

Red passes into blue in pimpernel.

C O L

Blue is changed into white in bell-flower, Greek valerian, bind-weed, columbine, violet, vetch, milk-wort, goat's-rue, viper's-bugloss, comfrey, borage, hyffop, dragon's-head, scabious, blue-bottle and succory.

Blue is changed into yellow in crocus.

Yellow passes easily into white in melilot, agrimony, mullein, tulip, *blattaria*, or moth-mullein, and corn marigold.

White is changed into purple in wood sorrel, thorn-apple, pease, and daisy.

Although plants are sometimes observed to change their colour upon being moistened with coloured juices, yet that quality in vegetables seems not so much owing to the nature of their nourishment, as to the action of the internal and external air, heat, light, and the primitive organization of the parts.

In support of this opinion, we may observe with Dr. Grëw, that there is a far less variety in the colours of roots, than of the other parts of the plant; the pulp, within the skin, being usually white, sometimes yellow, rarely red.

That this effect is produced by their small intercourse with the external air, appears from this circumstance, that the upper parts of roots, when they happen to stand naked above the ground, are often dyed with several colours: thus the tops of sorrel roots turn red; those of turnips, mullein, and radishes, purple; and many others green: whilst those parts of the same roots, which lie more under ground, are commonly white.

The green colour is so proper to leaves, that many, as those of sage, the young sprouts of St. John's-wort, and others which are reddish when in the bud, acquire a perfect green, upon being fully expanded.

In like manner, the leaves of the sea-side grape, *polygonum*, which, when young, are entirely red, become, as they advance in growth, perfectly green, except the middle and transverse ribs, which retain their former colour.

As flowers gradually open, and are exposed to the air, they throw off their old colour, and acquire a new one. In fact, no flower has its proper colour till it is fully expanded. Thus the purple stock gilly flowers are white, or pale, in the bud.

bud. In like manner, batchelor's-buttons, blue-bottle, poppy, red-daisy, and many other flowers, though of divers colours when blown, are all white in the bud. Nay, many flowers change their colours thrice successively; thus the very young buds of lady's looking-glass, bugloss, and the like, are all white; the larger buds purple, or murrey; and the open flowers, blue.

With respect to the colours of the juices of plants, we may observe that most resinous gums are tintured; some, however, are limpid; that which drops from the domestic pine, is clear as rock-water. The milk of some plants is pale, as in burdock; of others, white, as in dandelion, euphorbium, and scorzonera; and of others yellow, as in lovage, and greater celandine. Most mucilages have little colour, taste, or smell.

Of all the colours above enumerated, green is the most common to plants, black the most rare.

Most plants, either by decoction, or long infusion, communicate a green colour to oil. Saffron gives it a light golden tincture.

Several aromatic plants, as mint, marjoram, balm, being dried and infused in oil, give it a double tincture, both green and yellow; one drop of the oil shewing green; but a good quantity of it held up against a candle, looks reddish, or of a deep yellow colour.

Alkanet root, the *anchusa minor purpurea* of Parkinson, is the only vegetable yet known, which gives a true red tincture to oil; yet will it not colour water in the least.

Red roses being dried, and infused for some time in oil of aniseed, a more potent menstruum than common oil, lose their own colour entirely, and turn white, without effecting any change on the oil, which remains limpid as at first.

As oil rarely takes a red, there being but one known instance of it; so there is no plant that I know of, which, by infusion, will give a perfect green to water.

But although the green leaves will not give their visible colour, by infusion in water, yet will they impart most other colours, as well as the flowers themselves. Thus the leaves

of cinquefoil give a tincture resembling Rhenish wine; those of hyssop, Canary; of strawberry, Malaga; of mint, Muscadine; those of wood-forrel produce a tincture resembling a mixture of Claret and water; of balm, near as red as ordinary Claret alone. All aromatic hot plants give a yellow-red tincture to water, as well as oil. These leaves, however, do not all give their tincture in the same space of time; some require a fortnight; others a week; others five, three, or two days; and some but one, or even half a day.

Spirit of wine is as unsusceptible of a blue colour, as the two former menstrua are of a red and a green. In fact, several blue flowers, as lark-heel, violet, mallows, borage, being infused in that spirit, produce no sensible effect; in changing its colour: yet upon dropping a little spirit of sulphur, or sal-ammoniac, into the infusion, it immediately becomes a full red in the first case; a deep green in the other:—the precise effects which these substances would have produced, if the liquor had been previously of a blue colour.

Balm, the green leaves of which, as we observed above, give a Claret colour to water, gives a pure and perfect green to spirit of wine.

Yellow and red flowers give a stronger and fuller tincture to water than to spirit of wine; as may be seen by comparing the infusions of cowslips, poppies, clove gilly-flowers, and roses, in either liquor.

Let us now examine what changes are effected in colour, by the mixture of the infusions of plants with other bodies.

A strong infusion, or the juice, of the leaves of rose-tree, raspberry, strawberry, cinquefoil, gooseberry, primrose, Jerusalem-cowslip, peony, bistort, laurel, and goat's-beard, dropped upon steel, makes a purple tincture.

Sugar of lead dropped on a tincture of red roses, turns it to a faint pale green.

Salt of tartar dropped upon the same tincture, turns it to a deeper green.

Spirit of sulphur dropped on the green leaves of Adonis flower, everlasting-pea, and hollyhock, turns them all yellow,

Salt

C O L

Salt of tartar dropped on the whiteflowers of daify, changes them into a light green.

Of all colours, yellow seems to be the most fixed and unfading. No sensible change is effected by dropping the spirit of sulphur, or a solution of tartar, on a tincture of the yellow flowers of crowfoot, adonis, and saffron.

Of all water-colours, the rarest and most difficult to make clear, bright, and permanent, is blue. There are many flowers of an excellent blue colour, as those of the bugloss, lark-heel, and others; but they easily fade. Among the very few instances of flowers that will strike into a blue, may be mentioned lathyrus, or the everlasting pea, which, upon the affusion of spirit of hartshorn, is changed from a peach to a pure blue. Other alkalis, and particularly lime-water, will, no doubt, have the same effect, and perhaps, render the colour more permanent.

For a full discussion of this curious subject the reader is referred to a very ingenious treatise of the learned Dr. Grew on the Colours of Plants, read before the Royal Society, from which many of the above observations and experiments are taken.

We proceed to make some further remarks on the colours of plants, with reference to method and systematic arrangement.

Colour being, as we have seen, so very susceptible of change, ought never to be employed in distinguishing the different species of plants, which are to be characterized from circumstances not liable to alteration by culture, or other accidents.

Hitherto we have treated principally of the inconstancy of colour in flowers, as the tulip, hyacinth, anemone, ranunculus, primrose, blue-bottle, bell-flower, columbine, violet, fumatory, and many others.

The same inconstancy is observed in other parts of the plant; berries frequently change from green to red, and from red to white. Even in ripe fruits, the colour, whether white, red or blue, is apt to vary; particularly in apple, pear, plumb, and cherry-trees.

Seeds

C O L

Seeds are more constant in point of colour, than the vessel which contains them. In the seeds, however, of the poppy, oat, pea, bean, and kidney-bean, variations are frequently observed.

The root too, although not remarkably subject to change, is found to vary in some species of carrot and raddish.

Leaves frequently become spotted, as in a species of orchis, hawk-weed, ranunculus, knot-grass, and lettuce; but seldom relinquish their green colour altogether. Those of some species of amaranthus, or flower-gentle, are beautifully coloured.

The spots that appear on the surface of leaves, are of different colours, liable to vary, and not seldom disappear altogether.

The leaves of officinal lungwort, and some species of slow-bread, sorrel, trefoil, and ranunculus, are covered with white spots. Those of dog's-tooth violet, with purple and white.

Those of several species of ranunculus, and orchis, and a kind of knot-grass, called by Tournefort, *Perficaria ferum equinum referens*, with black and purple.

Those of *Amaranthus tricolor*, with green, red, and yellow.

Those of *Ranunculus acris*, and a species of bog-bean, with red, or purple.

The under surface of the leaves of some species of pimpernel, and of sea plantain, is marked with a number of dots, or points. A white line runs through the leaves of Indian-reed, black-berried heath, and a species of canary-grass; and the margin, or brim of the leaf, in some species of box, honey-suckle, ground-ivy, and the ever-green oak, is of a silver-white colour.

The whole plant is often found to assume a colour that is unnatural, or foreign to it. The varieties in some species of eryngo, mugwort, orach, amaranthus, purslane, and lettuce, furnish examples.

Such being the inconstancy of colour in all the parts of the plant, specific names derived from that quality are, very properly, by Linnæus, deemed erroneous; whether they
respect

respect the colour of the flower, fruit, seeds, root, leaves; or express in general, the beauty or deformity of the entire plant, with a particular view to that circumstance. Of this impropriety, so generally committed by former botanists, Linnæus himself is not always guiltless. Thus the two species of *farracenia*, or the side-saddle flower, are distinguished by the colour of their petals into the yellow and purple *farracenia*; although the shape and figure of the leaves afforded much more constant, as well as striking, characters. The same may be said of his *lupinus albus*, & *luteus*; *Reseda alba*, *glauca*, & *lutea*; *Angelica atropurpurea*; *Dictamnus albus*; *Lamium album*; *Selago coccinea*; *Sida alba*; *Passiflora rubra*, *lutea*, *incarnata*, & *cœrulea*; and of many others, in which the specific name is derived from a character or quality that is so liable to vary in the same species. I conclude this article with observing, that of all the sensible qualities, colour is least useful in indicating the virtues and powers of vegetables. The following general positions on this subject, are laid down by Linnæus, and seem sufficiently confirmed by experiment.

A yellow colour generally indicates a bitter taste; as in gentian, aloe, celandine, turmeric, and other yellow flowers.

Red indicates an acid, or sour taste; as in cranberries, berries, currants, raspberries, mulberries, cherries; the fruit of the rose, sea-buck-thorn, and service-tree. Herbs that turn red towards autumn, have likewise a sour-taste, as sorrel, wood-sorrel, and bloody dock.

Green indicates a crude alkaline taste, as in leaves and unripe fruits.

A pale colour denotes an insipid taste, as in endive, asparagus, and lettuce.

White promises a sweet, luscious taste; as in white currants, and plumbs, sweet apples, &c.

Lastly, black indicates a harsh, nauseous, disagreeable taste; as in the berries of deadly nightshade, myrtle-leaved sumach, herb-christopher, and others; many of which are not only unpleasant to the taste, but pernicious, and deadly in their effects,

C O L

To discover the acid, or alkaline quality of any plant, express some of the juice, and rub it upon a piece of blue paper, which, if the plant in question is of an acid nature, will turn red; if of an alkaline, green.

COLUMELLA, (*quasi Columnella*, a little pillar, or column.) The substance which passes through that species of seed-vessel called a capsule, and connects the several internal partitions with the seed. *Vide CAPSULA*.

COLUMNIFERÆ, from *columna*, a pillar; and *fero*, to bear. The name of the 37th order in Linnæus's Fragments of a Natural Method, consisting of plants whose stamina and pistil have the appearance of a pillar in the centre of the flower.

List of the Genera contained in this Natural Order.

S E C T I O N I.

Plants with Stamina that are distinct, and inserted into the common Receptacle.

Linnæan Genera.		English Names.
<i>Bixa</i> ,	—	Arnotta, or Anotta; by the French termed Roucou.
<i>Corchorus</i> ,	—	Jew's-Mallow.
<i>Heliotarpus</i> ,	—	Tree Montia.
<i>Kiggelaria</i> .		
<i>Microcos</i> .		
<i>Muntingia</i> .		
<i>Thea</i> ,	—	Tea-Tree.
<i>Tilia</i> ,	—	Lime, or Linden-Tree.
<i>Turnera</i> .		
<i>Triumfetta</i> .		

S E C T I O N II.

Plants with Stamina that are distinct, and inserted into the Pistillum, or Pointal. (Gynandria.)

Ayenia.
Grevia.

Helicteres,

COL

Linnæan Genera.		English Names.
<i>Helicteres</i> ,	—	— Screw-Tree.
<i>Kleinbovia</i> .		

SECTION III.

Plants with one or more sets of united Stamina.

<i>Adansonia</i> ,	—	—	Æthiopian Sourgourd, or African Calabash-Tree.
<i>Alcea</i> ,	—	—	Hollyhock, or Rose-Mallow.
<i>Althæa</i> ,	—	—	Marsh-mallow.
<i>Bombax</i> ,	—	—	Silk Cotton-Tree.
<i>Camellia</i> .			
<i>Gossypium</i> ,	—	—	Cotton.
<i>Hermannia</i> .			
<i>Hibiscus</i> ,	—	—	Althæa Frutex, or Syrian Mallow.
<i>Lavatera</i> ,	—	—	Sea Tree-Mallow.
<i>Malope</i> ,	—	—	Bastard Mallow.
<i>Malva</i> ,	—	—	Mallow.
<i>Melochia</i> .			
<i>Napæa</i> .			
<i>Pentapetes</i> ,	—	—	Indian vervain Mallow.
<i>Sida</i> ,	—	—	Indian Mallow.
<i>Stewartia</i> .			
<i>Theobroma</i> ,	—	—	Chocolate-nut, or Bastard Cedar of Jamaica.
<i>Urena</i> .			
<i>Waltheria</i> .			

Habit and Structure of the Plants of this Order.

This order furnishes a choice and curious collection of herbs both annual and perennial, shrubs, and trees. These are very different in point of size and height, from the creeping mallows, and low shrubby tea-tree, to the lofty limes, and still more lofty silk cotton-trees, which, by some modern writers, are affirmed to be so large, as not to be fathomed

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fathomed by sixteen men, and so tall, that an arrow cannot reach their top.

The size of the African calabash-tree, or Æthiopian four-gourd, the Baobab of Prosper Alpindus, as described by M. Adanson, is truly amazing. The diameter of the trunk, he says, frequently exceeds 25 feet; and the breadth of the tree at top, measures from 120 to 150 feet. The horizontal branches, he continues, are from 45 to 55 feet long; and so large in circumference, that each branch is equal to a monstrous tree in Europe. The roots too, where the water of a neighbouring river has washed away the earth so as to leave them bare and open to view, measure one hundred and ten feet long, exclusive of those parts which remain covered with earth, or sand; and yet, amazing as these dimensions are, the height of the tallest tree, mentioned by that author, does not exceed seventy feet. *Vide Adanson's Voyage au Senegal, & Famille des Plantes*, Tom. 1, p. 211. *Preface*.

The shrubs and trees of this order are deciduous, pretty thick, of a beautiful appearance, with an erect stem, which is formed by its branches and foliage into a round head.

The ROOTS are extremely long, branch but little, and either run perpendicularly downwards, as in plants of the first and second sections; or extend themselves horizontally below the surface, as in those of the third.

The STEMS are cylindric. The young branches, though commonly of the same figure, are sometimes angular.

The BARK is thick, and pliant.

The WOOD, in general, very soft and light.

The BUDS are of a conic form, naked, that is, without scales, and situated either at the extremity of the branches, or in the angle formed by the branch and leaf. Syrian mallow, Ethiopian fourgourd, and *lavatera*, have no buds.

The LEAVES are alternate, simple, divided into several lobes, and frequently hand or finger-shaped. The ribs, or nerves, on the back of the leaf, in some genera of this order, are provided near their origin with a number of hollow furrows, or glands, which being filled with a clammy honey-like liquor, have been considered as so many vessels of secretion.

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cretion. Egyptian and Syrian ketmia, *bibiscus*, have one hollow of this kind, placed on the middle rib. The cotton-tree has three, two of which frequently disappear in cold climates; *urena* has sometimes three hollows, but most commonly one.

The FOOT-STALK of the leaves is cylindric, swelled at its origin, and appears jointed at its junction with the branch. In some species of Syrian mallow, and *turnera*, the flowers and leaves are borne on the same foot-stalks; or, to speak more properly, the foot-stalk of the flower proceeds from the foot-stalk of the leaf. At each side of the foot-stalk are generally fastened two *stipulae*, or scales, which are simple, of a moderate size, commonly erect, and fall before the other leaves of the plant. The glands, or vessels of secretion at the base of the leaves in tree montia, furnish essential marks in distinguishing the species.

The stems and branches of some species of Syrian mallow, and silk cotton-tree, are armed with long conic prickles, which in the latter are sometimes two inches in diameter, and fall off very early, being only fastened to the bark. A species of silk cotton-tree, called by Linnæus *Bombax pentandrum* from the number of its stamina, has its stem, when young and tender only, covered with prickles; that of the full grown tree being very smooth, and unarmed. Tree-montia, and triumfetta, when young, bear downy leaves; when full grown, those of the former are smooth; those of the latter, prickly.

The FLOWERS are universally hermaphrodite, except in *kiggelaria*, and a species of Virginian marsh-mallow, called by Linnæus, *Napæa dioica*; the former of which bears male and female, the latter male and hermaphrodite, flowers on different roots.

In plants of the third section, the flowers generally open about nine in the morning, and remain expanded till one o'clock in the afternoon. These same flowers, as they wither, are subject to change their colour; the red become violet, or purple; the white contract a flesh colour; and the
yellow

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yellow turn white. The flowers of *Triumfetta* are rolled or turned backwards, in the night time.

The flowers either terminate the branches, proceed from the angles of the leaves, or are disposed either singly, or in a *corymbus*, along the branches, or stem. *Vide CORYMBUS.*

The FLOWER-CUP is single in plants of the first and second sections; but frequently double in those of the third. In these last, the inner calyx is always of one piece generally divided into five segments; the outer consists either of one leaf; as in cotton-tree, and marsh-mallow; of three distinct leaves, as in mallow and bastard-mallow; or of many, as in Syrian mallow. The small scales, which frequently accompany the calyx of Indian vervain-mallow, *pentapetes*, are not a second calyx, as Miller fancies, but *stipulae*, which fall off soon after their production. *Vide STIPULA.*

The calyx, when single, is sometimes composed of one leaf, which is permanent; as in *arnotta*, and *hermannia*: or of several distinct leaves, which, in plants of the first section, are generally coloured, and fall off with the petals; as in *microcos* and Jew's-mallow.

In plants that have a double calyx, both flower-cups are generally permanent.

The PETALS in this order, are in number from four to nine; five is the prevailing number. In some species of silk cotton-tree, the flower consists of one petal only, which is shaped like a funnel, and divided into five segments at top; most flowers of the tea-tree have six petals; some, however, are observed to have nine, three of which are external, equal, and of a middling size; six internal, equal, and very large. *Arnotta* has a double *corolla*, or rather a double row of petals; each row consisting of five oblong and large petals, which are equal. Plants of the third section have universally five petals, which are heart-shaped, terminated below by a claw or stalk which attaches them to the receptacle of the calyx, and closely embrace or infold each other above, so as to form the appearance of a single petal. They are alternate with the divisions of the calyx, and fall

soon

soon after their expansion. The lapping, or embracing of the petals just mentioned, is always found to be in a direction contrary to the apparent diurnal motion of the sun.

In many flowers of this order is found that species of superfluity to which Linnæus has given the indefinite name of NECTARIUM; this appearance adds greatly to the beauty of the flower; and is particularly conspicuous in *hermannia*, chocolate-nut, *kiggelaria*, and the plants of the second section. *Vide Supra.*

The spring flowers of a species of Jew's-mallow, called by Linnæus *corchorus filiquosus*, have no petals, and but four stamina; the autumnal flowers of the same species have five petals, and numerous stamina. A species of screw-tree, termed *heliicteres apetala*, wants likewise the petals, as the name imports.

The STAMINA, which are in number from five to twenty, and upwards, are generally inserted into the common receptacle of the calyx, in plants of the first and third sections; into the *pistillum*, or seed-bud, in those of the second.

The FILAMENTS, or threads of the stamina, are distinct in the two first sections; but in the third are united into a cylinder, which proceeding from the receptacle of the calyx, surrounds the seed-bud, and attaches itself to the base of the petals, which it slightly unites. Silk cotton-tree has the appearance of several sets of stamina so united; and, in the genus *pentapetes*, are interspersed betwixt the fertile stamina, which are fifteen in number, five longer filaments that are coloured, erect, and castrated, that is, without anthers.

The ANTHERS, or tops, are frequently roundish, and placed erect on the filament; most commonly, however, they are oblong, or kidney-shaped, and slightly attached by the middle, or sides, to the filaments, on which they turn like a vane, or needle. *Vide ANTHERÆ Incumbentes, & Versatiles.*

This last is particularly the characteristic of all the mallow tribe.

Helicarpus has twin anthers, or two upon each filament; chocolate nut, five.

In *kiggelaria*, the tops are perforated, and gape in two different places.

The SEED-BUD is generally roundish, or conic, and sometimes, as in tea-tree, angular.

The genus *grevia* has its seed-bud furnished with a long foot-stalk, by which it is attached to a receptacle shaped like a pillar, erect, and cut into five angles at its brim.

From the summit of the seed-bud arise the styles, which in this order are from one to five, thread-shaped, of the length of the stamina, and crowned with a *stigma*, which is generally thick, blunt, and sometimes cornered.

Muntingia has a hairy seed-bud, no style, and a five cornered *stigma*, or summit.

In plants of the third section, which have a true classic character, the receptacle of the fructification, or that to which the flower and fruit are attached, is prominent in the centre of the flower. The seed-bud is erect, and surrounds the top of the receptacle in a jointed ring. The style forms one body with the receptacle below, but is generally divided above into as many branches, or threads, as there are cells, or partitions in the seed-bud. Each of these branches is crowned with a thin, spreading, and frequently hairy *stigma*.

The SEED-VESSEL is generally a capsule; sometimes a pulpy fruit of the berry, or cherry kind. In plants of the third section, it is a woody, or membranous capsule, which is divided into as many cells internally, as there were partitions in the seed-bud. The capsule, in these same plants, is frequently formed by the union of so many proper coats, or coverings of the seed, called by Linnæus *arilli*. *Vide* ARILLUS.

The capsule of the lime-tree is divided into five cells; yet, as only one seed arrives at perfection, the rest proving abortive, we might be apt, without previously viewing them in the seed-bud, to commit a mistake, and conclude that the capsule was furnished with only one cavity. A similar abortion sometimes takes place in the genus *triumfetta*, which has
a round

a round capsule, armed on every side with strong hooked prickles.

Tree-montia has a hooked seed-vessel of the same kind.

The seed-vessel of the genus *hibiscus*, is generally a capsule; in a particular species, called by Linnæus *hibiscus malaviscus*, it is a roundish berry, with five cells containing ten seeds. *Stewartia*, according to the same author, has a dry seed-vessel, of the apple kind.

In tea-tree, and hermannia, the capsule splits at the top; in lime-tree, at the base. The woody capsule of Ethiopian four gourd does not split, or open at all.

The SEEDS are generally solitary; sometimes angular, and, in plants of the last section, kidney-shaped.

These plants are mucilaginous, and lubricating.

The lime-tree contains a gummy juice, which being repeatedly boiled and clarified, produces a substance like sugar. Arnotto is bitter, and aromatic. The fresh, or green leaves of tea, according to Kæmpfer, are disagreeably bitter, narcotick, and injurious to the brain and nerves; but these bad qualities are entirely destroyed by the preparation which they undergo before they are exposed to sale.

Applied externally, these plants, particularly those of the last section, are highly emollient; taken internally, they correct acrid humours, allay excessive heats in the blood, internal inflammations, irritations, and heat of urine; and are of great benefit in the cough, strangury, stone, and cholic.

The seeds of arnotta, within their capsule, are covered on the surface with a reddish powder, or dust, with which the American Indians paint their bodies. This powder, said to be used sometimes as an antidote against poison, is taken off by steeping the seeds in hot water, until it has totally subsided; the water being then poured off, the sediment is left to harden, and afterwards made up in balls, which are sent to Europe, for the use of dyers, and painters.

The leaves of common Jew's-mallow, the *olus judaicum* of Avicenna, are used in the East Indies, and by the Jews about Aleppo, as a pot-herb. *Rauwolf's Travels.*

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An infusion of the flowers of the lime-tree has been used with success in an epilepsy. The timber, which is too soft for any strong purposes, is principally employed by the carvers, and turners, as likewise by architects, for framing the models of their buildings. The flowers of the Carolina lime-tree emit a very fragrant odour, and are constantly haunted by bees during their continuance.

The Negroes of Senegal, in Africa, put a very high value on a decoction of the bark of a species of *Grevia*, which they call *Kell*, and consider as a never failing specific in venereal complaints.

The screw-tree derives its name from the figure and appearance of the fruit or seed-vessel, which is composed of five capsules that are closely and spirally twisted over one another like a screw; they are hairy, and consist each of one cell inclosing several kidney-shaped seeds.

Prosper Alpinus, in his History of Egyptian Plants, describing Ethiopian sourgourd, by the name of *Baobab*, affirms that the much celebrated Lemnian Earth, was nothing else than a preparation of the powder of the fungous and sour pulp, surrounding the seeds of that tree, which M. Adanson asserts had been transported from Senegal into Egypt, by the Arabs. Be that as it may, we are assured from very good authority, that the powder in question is very much used at this day, both in decoction and infusion, not only in Cairo, but in all parts of the Levant, for thick, fizy blood, diarrhœas, pestilential and putrid fevers, and disorders arising from similar causes. At Senegal, this powder is applied to the same purposes; as is likewise that of the leaves of the tree, a quantity of which the Negroes mix every day in their food. To this last powder they have given the name of *Lalo*.

The age of this tree is, perhaps, not less remarkable than its enormous size. M. Adanson relates, that in a botanical excursion to the Magdalen Islands, in the neighbourhood of Goree, he discovered some calabash-trees, from five to six feet diameter, on the bark of which were engraved, or cut to a considerable depth, a number of European names. Two

of

of these names, which he was at the trouble to repair, were dated, one the fourteenth, the other the fifteenth century. The letters were about six inches long, but in breadth they occupied a very small part only of the circumference of the trunk: from whence he concluded, they had not been cut when these trees were young. These inscriptions, however, he thinks sufficient to determine pretty nearly the age which these calabash-trees may attain; for, even supposing that those in question were cut in their early years, and that the trees grew to the diameter of six feet in two centuries, as the engraved letters evince, how many centuries must be requisite to give them a diameter of twenty-five feet, which, perhaps, is not the last term of their growth!

The inscribed trees, mentioned by this ingenious Frenchman, had been seen in 1555, almost two centuries before, by Thevet, who mentions them in the relation of his Voyage to Terra Antarctica, or Australis. Adanson saw them in 1749.

The silk cotton-tree (*Bombax*) is a native both of the East and West Indies, and takes its name from the fine silky down with which the seeds are wrapped within the capsule, and which, in different species, is of different colours, and in different degrees of estimation. The dark short down, or cotton, is seldom used, except by the poorer sort, for stuffing pillows or chairs; being generally esteemed unwholesome to lie upon. By the inhabitants of the Spanish West Indies, the beautiful purple down is spun, wrought into cloaths, and wore, without being dyed of any other colour.

Large pirogues, or canoes fit to carry a sail, are made both at Senegal, and in America, of the trunk of the silk cotton-tree, the wood of which is very light, and found unfit for any other purpose. In Columbus's first voyage, says Miller, it was reported a canoe was seen at the island of Cuba, made of the hollow trunk of one of these trees, which was ninety-five palms long, of a proportionable width, and capable of containing a hundred and fifty men. *Vide* Miller's Gardener's Dict. voce *Bombax*.

Bosman, in his Description of Guinea, says, he has seen

one of these trees so widely diffused that 20,000 men, closely armed, might easily stand under the branches.

Cotton-wool is the produce of the small, or shrubby cotton-tree. This plant grows in form of a bush, and sends forth branches that stretch wide, and are garnished with leaves somewhat less than those of the sycamore, but almost of the same shape. It bears a great many fine yellow large flowers composed of five petals, each of which is tinged at the bottom with a purple colour. The seed-bud, which is of the same colour, is placed in the middle of the flower. It is of an oval or conic shape, and grows in time to the size of a pigeon's-egg. When ripe, it becomes black, and splits into three or four partitions at top, discovering the cotton, or down, which infolds the seeds, and appears white as snow, in as many flakes as there are cells or internal divisions in the capsule. In these flakes, which swell with the heat to a considerable bigness, are interspersed several black seeds, as large as lupines, of a sweet taste, white within, oily, and adhering together.

The cotton, of which, in the East Indies, they make their finest calico, is too well known to require a farther description. Suffice it to observe with Mr. Hughes, in his Natural History of Barbadoes, that indulgent Providence has sufficiently supplied the want of wool, denied to the sheep in the warmer climates, by causing a vegetable, in such countries, to bear the finest wool in the world.

The certainty of gathering a good crop of this kind, is very precarious; since it may be almost literally said of this shrub, that in the morning it is green, and flourishes; and almost in the same evening, withers, and decays. For when the worms begin to prey upon a whole field of cotton-trees, though they are at first scarce perceptible to the naked eye, yet, in three days, they will grow to such a size, and prove so destructive, as to reduce the most verdant field, thickly and beautifully cloathed with leaves and flowers, into almost as desolate and naked a condition as trees are in the month of December, in England. When these worms, which are of the caterpillar kind, have attained their full growth, they spin, and inwrap themselves as in a bag, or web,
like

like silk-worms, in the few remaining leaves, or any other covering: and after a few days rest in this their Aurelia-state, turn into dark-coloured moths and fly away.

Cotton-flowers, if carefully wrapped up in the leaves of the same tree, and baked, or roasted over a fire of burning coals, yield, says Pomet, a reddish viscous oil, that quickly cures old standing ulcers. Of the black seed an oil may be made, which beautifies the face, removes spots and freckles, and possesses the same virtues with the oil of cokarkernels. The cotton, or down itself, is said to do wonders in the gout, by being burnt upon the part; but its efficacy can be no other than that of fire, or quick-lime; whatever good attends this practice being wholly owing to the burning.

The flowers of the China rose, *hibiscus mutabilis*, (so termed by Linnæus from the circumstance to be mentioned), alter remarkably in their colour. At their first expansion, they are white; they then change to a deep red, or rose colour, which, as they decay, turns to a purple. In the West-Indies, where it goes by the name of Martinico rose, all these alterations happen in the course of one day; which, in those hot countries, is the longest duration of the flowers in question; but in England, where they continue near a week in perfection, the changes are not so sudden.

Tree vervain mallow of Java, another species of *hibiscus*, the *Rosa sinensis* of Linnæus, produces double flowers, composed of several roundish petals of a red colour, which expand like the common rose. With these flowers, the women on the coast of Malabar, where the plant naturally grows, tinge their hair and eye-brows of a black colour, which will not wash off; the English residing on the same coast, use it for blacking their shoes, and thence have named it shoe-flower. The green leaves, whisked in water, make a lather like that which is made with soap; and, as we are informed by Kolben, are preferred to that substance for washing the hands and face, by the Europeans at the Cape of Good Hope, where the plant has long been introduced from India.

The leaves of a North American species of *hibiscus*,
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termed by Linnæus *Moscheutos*, from a very probable conjecture that it is the *Moscheuton* or true rose-mallow of Pliny, are soft, and in figure resemble those of the maple. The flower is very large, and white, and seated not on the peduncle, but petiole or foot-stalk of the leaves, like that of *Turnera ulmifolia*. The root employed in medicine, says Clayton, has a paregorick or pain-alleviating quality.

A species of *Hibiscus*, the *pspulncus* of Linnæus, the *Novella* of Rumphius, the *Bupariti* of the *Hortus Malabaricus*, is termed, by the natives of Ceylon, Surighalias, that is, Sun-Tree. The flowers, which, as others of the same genus; are ephemeral, have a dingy gloomy colour at the rising of the sun, when they expand; but acquire a reddish hue at its setting, when they fall off.

The fig-leaved *hibiscus* is cultivated by the inhabitants of the West-Indies for its pods, which, having a soft viscous juice, add a thickness to their soups, and render them palatable.

The fruit of the okra, the *Hibiscus esculentus* of Linnæus, is taken, when young and tender, and boiled, and eaten with butter. The plant itself is of a very mucilaginous nature, a great restorative, very wholesome, and extremely lubricating. It is perhaps the plant which the Romans valued so much, and Horace so well characterizes by the name of *levis malva*, or light mallow, which proves of easy digestion, and lightens the stomach*.

A thimble full of the small brownish seeds of a species of hollyhock, or tree-mallow, described by Hughes, in his Natural History of Barbadoes, taken inwardly, proves an excellent purge; and the yellow juice that plentifully distils from the stalk when broken, is a sovereign remedy to cure old ulcers,

A decoction of the roots of a species of *napæa*, called by the Negroes *lafs*, is deemed a sovereign remedy in the vene-

* ————— " *Mc pascunt olivæ,*
Mc cichorea, LLVESQUE MALVÆ."

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real disease, which they are said to cure without any bad consequences, by means of this plant alone.

Note. The name of the genus *Napæa*, is derived from the Greek *ναπη*, *salus*, *lucus*, *vel vallis*, a grove, or valley, and expressive of the places where the plants which compose it are generally found. In the Mythology of the Poets, the Nymphs, who presided over such retreats, were called *Napææ*.

In the parts of the fructification of the genera *Adansonia* and *Bombax*, there is a remarkable affinity. They, indeed, principally differ in the seeds, which, in the first genus, are involved in a friable pulp; in the latter, covered with the soft, silky substance, from which it has obtained both its scientific and English names.

Common marsh-mallow, the *althæa officinalis* of Linnæus, is an herbaceous perennial, which grows naturally in moist places, in several provinces of England, France, Holland, and in Siberia. The juice is insipid to the taste, and, in the roots, mucilaginous. The herb, flowers, and root, which last is one of the five emollients, are employed in medicine. They are esteemed balsamic and pectoral, and frequently ordered in fomentations to ease pain, as likewise to suppurate tumours and imposthumes. The seeds are rarely used. Marsh-mallow may be distinguished from the tribe of common-mallow, principally by the softness and length of the leaves.

From the bark of most plants of the mallow-tribe, may be procured a sort of hemp, which, if properly managed, might be wrought into cordage, or indeed into fine strong thread of any size.

The inhabitants of the West-Indies cut the Indian mallows, *sida*, in the same manner as we do heath, and make them up into brooms for sweeping. Hence they are frequently sent into Britain by the title of broom-weed. A cataplasm of the pounded leaves of the same plant is reckoned an excellent vulnerary.

I conclude this article of the pillar-shaped-flowers, with a short history of the Tea-plant, its culture, growth, preparation,

paration, and uses, from the accurate description of Kämpfer, in his Natural History of Japan.

This shrub, formerly described by Dr. Breynius, in his Century of Exotic Plants, published at Dantzick, in 1678, is of a very slow growth, and diminutive size. It has a black, woody, irregularly branched root. The rising stem soon spreads into many irregular branches, and twigs. These, at the lower end, and near the ground, often seem to be more in number than they really are; for several seeds being put together in one hole, it frequently happens that two, three, or more shrubs grow up together, and so close to one another, as to be easily mistaken for one, by ignorant, or less attentive observers. The bark is dry, thin, weak, chestnut-coloured, firm, and adheres closely to the wood. It is covered with a very thin skin, which being removed, the bark appears, of a greenish colour, bitter nauseous and astringent taste, with a smell much like the leaves of hazel-nut tree, only more disagreeable and offensive. The wood is hard, fibrous, of a greenish colour inclining to white, and of a very offensive smell, when green. The pith is very small, and adheres close to the wood. The branches and twigs are slender, of different sizes, irregularly beset with simple leaves standing on very small, fat, green foot-stalks, and resembling, when full grown, the leaves of the garden cherry-tree; but when young, tender, and gathered for use, those of the common spindle-tree, the colour only excepted. The leaves are smooth on both sides, closely and unequally sawed on the edge, of a dirty dark green colour, which is somewhat lighter on the back, where the nerves being raised considerably, leave so many hollows, or furrows on the opposite side. They have one very conspicuous nerve in the middle, which is branched out on each side into five, six, or seven thin transverse ribs, of different lengths, and bent backwards, near the edges of the leaves: between these transverse ribs, run a number of small veins. The leaves, when fresh, have no smell at all, and though astringent and bitterish, as we observe above, are not nauseous, as the bark. They differ very much in substance, size, and shape,

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according to their age, and the situation and nature of the soil in which the shrub is planted. From the wings of the leaves come forth the flowers in autumn. These continue to grow till late in winter, and are composed of six petals; one or two of which are generally shrunk, and fall far short of the largeness and beauty of the others. The foot-stalk of the flower is about half an inch long, and ends in six very small green leaves, which serve instead of the calyx, or flower-cup. This description, applied by Kämpfer to the shrub, which, as he pretends, produces all the different sorts, or preparations of tea, corresponds, says Linnæus, to a particular species only, termed by him Bohea; for some tea plants, he observes after Dr. Hill, produce flowers composed of nine petals, which must therefore constitute a distinct species from such as have only six. From this circumstance is constructed the other species of that author, *thea viridis*, or green tea, the flowers of which have always nine petals.

To proceed in our description. Within the petals, which are of a very unpleasant bitterish taste, are placed many white stamina, exceedingly small as in the wild rose, with yellow heads in shape not unlike a heart. Kämpfer reckoned in one flower, two hundred and thirty of these stamina. To the flowers succeed the fruits in great plenty; these are composed of one, two, but most commonly of three capsules, of the bigness of wild plumbs, adhering, like the seed-vessels of the palma christi, to one common foot-stalk as to a centre, but divided into three pretty deep partitions. From this character, we may see how improperly Linnæus has placed the tea-tree in the natural order we have been describing, when the striking circumstance of its tricapsular fruit seemed so naturally to point out its connection and affinity with those plants which possess the same remarkable character. *Vide* TRICOCCÆ. Each capsule contains a husk, nut, and seed. The kernel, or seed, is reddish, of a firm substance like filberds, contains a great quantity of oil, and is very apt to grow rank, which is the reason why there are scarce two in ten that will germinate when sown. The natives

natives make no manner of use of either the flowers, or kernels.

The shrub must be, at least, of three years growth, before the leaves, which it then bears in plenty, are fit to be plucked. In seven years time, or thereabouts, it rises to a man's height; but as it then grows slowly, and bears but few leaves, the natives generally cut it down quite to the stem, after having first gathered what few leaves it produced. The next year, out of the remaining stem proceed many young twigs and branches, which bear such abundance of leaves, as sufficiently compensates for the loss of the former shrub. Some defer the operation of cutting down to the stem, till the shrub is of ten years growth.

The leaves must not be tore off by handfuls, but plucked carefully one by one, and are not to be gathered all at once, but at different times. Those who pluck their shrubs thrice a year, begin their first gathering about the end of February. The shrub then bears but a few leaves, which are very tender and young, and not yet fully opened, as being scarce above two or three days growth. These small and tender leaves are reckoned much better than the rest, and, because of their scarcity and price, are disposed of only to princes and rich people; for which reason they are called Imperial tea, and by some the flower of tea. The second gathering, and the first of those who gather but twice a year, is made about the latter end of March, or beginning of April; some of the leaves are then already come to perfection, others are but half grown; both, however, are plucked off promiscuously, though care is afterwards taken, previous to the usual preparation, to arrange them into classes, according to their size and goodness. The third, and last gathering, which is also the most plentiful, is made in the end of May, when the leaves have attained their full growth, both in number and size. The leaves of this gathering are arranged in like manner as the former, according to their size and goodness, into different classes, the lowest of which contains the coarsest leaves of all, being full two months grown, and that sort which is commonly drunk by the vulgar.

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The preparation of the leaves consists in drying or roasting them when fresh gathered, over the fire, in an iron pan, and rolling them when hot with the palm of the hand on a mat, till they become curled. The particulars of this preparation, as related by the ingenious author from whom this description is extracted, are much too tedious for my purpose. The reader is therefore referred to the work itself. *Vide Kæmpfer's History of Japan, Vol. 2, Appendix 1.*

The tea, after having undergone a sufficient roasting and curling, must, when cold, be put up, and carefully kept from the air. In this, indeed, the whole art of preserving it chiefly consists; because the air, in those hot climates, dissipates its extremely subtile and volatile parts much sooner than it would in our colder European countries. The Chinese put it up in boxes of a coarse tin, which, if they be very large, are inclosed in wooden cases of fir, all the clefts being first carefully stopped both within and without. After this manner also it is sent abroad into foreign countries. The Japanese keep their stock of the common tea in large earthen pots with a narrow mouth. The better sort of tea, I mean that which the emperor himself, and the great men make use of, is kept in porcelain pots or vessels which are supposed to improve its virtues. The coarse tea of the third gathering is not so easily injured by the air as the other sorts; for though its virtues are comparatively fewer, and less sensible, yet are they more constant and fixed. The country people keep it, as well as the other sorts which they use, in straw baskets made like barrels, which they put under the roofs of their houses, near the hole which lets out the smoak; being of opinion, that nothing is better than smoak to preserve the virtues of the leaves, and even improve them. Some put it up with common mug-wort flowers, or the young leaves of a plant called sasanqua, which they believe renders it much more agreeable. Other odoriferous and aromatic substances are found, upon trial, to produce no such beneficial effect.

The tea, as it is taken inwardly, is prepared in two different ways. The first, used by the Chinese, and now all over Europe,

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Europe, is nothing else but a simple infusion of the leaves in hot water. The other way, which is peculiar to the Japanese, is by grinding. In this preparation, the leaves are, by means of a hand-mill made of a black-greenish stone, called serpentine stone, reduced into a fine delicate powder, which being mixed with hot water into a thin pulp, is afterwards sipped. This tea is called thick tea, to distinguish it from the simple infusion, and is drunk every day by the rich people and great men in Japan.

The narcotic quality of the fresh unprepared leaves of tea; mentioned above, is destroyed in a great measure, by a repeated and gradual roasting. This operation renders it exhilarating, refreshing, and cleansing. Kæmpfer observes, that tea is particularly serviceable in washing away that tartarous matter, which is the efficient cause of calculous concretions, nephritic and gouty distempers; and affirms that among the great tea-drinkers of Japan, he never met with any, who were troubled with the gout, or stone.

The leaves of tea, say writers on the *Materia Medica*, are much more used for pleasure than as medicine; the Bohea, however, is esteemed softening, nourishing, and proper in all inward decays; the Green is diuretic, carries an agreeable roughness with it into the stomach, which gently astringes the fibres, and gives them such a tenseness as is necessary for a good digestion. Improper, or excessive use, may, no doubt, render this, or any thing else, prejudicial; but, in general, there are very few herbs employed, either in food or medicine, which, used with moderation, are better, pleasanter, or safer than tea.

After the most diligent enquiries that I have been able to make, I do not find that the tea-plant grows naturally beyond the thirty-fifth degree of north latitude towards the equator, on the one hand, and the forty-fifth degree towards the pole, on the other.

COMA, a bush of hair; a collection of large *bractea*, or floral leaves, which, in crown imperial, lavender, sage, cow-wheat, and some other plants, terminate the flower-stem, and form an appearance like a tuft or bush of hair. *Vide BRACTEA.*

COMMUNES.

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COMMUNES. The name of a class in Linnæus's *Methodus Calycina*, consisting of plants which, like teasel and dandelion, have a calyx or flower-cup common to many flowers or florets. These are the aggregate and compound flowers of other systems. *Vide* **AGGREGATUS** and **COMPOSITUS Flos**.

COMOSÆ, from *coma*. An order of plants in the former editions of Linnæus's *Fragments of a Natural Method*, consisting of the spiked willow, or *spiræa frutex*, drop-wort, and greater meadow-sweet. These, though formerly distinct genera, are now by Linnæus collected into one, under the name of *spiræa*. The flowers, growing in a head, resemble a bush or tuft of hair, which probably gave rise to the epithet *comosæ*.

COMPLETUS Flos, a complete flower. A flower is said to be complete which is provided with both the covers, viz. the calyx or flower-cup, and the petals. *Vide* **CALYX** and **COROLLA**.

The term was invented by Vaillant, and is synonymous to *Calyculatus Flos*, in Linnæus. Berkenhout erroneously confounds it with the *auctus* and *calyculatus calyx* of the same author.

COMPOSITUS Flos, a compound flower; a flower formed of the union of several fructifications or lesser flowers within a common calyx; each lesser flower being furnished with five stamina, distinct at bottom, but united by the anthers into a cylinder, through which passes a style, considerably longer than the stamina, and crowned by a *stigma*, or summit, with two divisions that are rolled backwards. Such are the essential characters of a compound flower.

The other properties are as follows:

1. The common receptacle, or seat upon which all the lesser flowers are placed, is large, and entire, that is, undivided.
2. The lesser flowers themselves consist universally each of one petal, which sits upon the receptacle without any foot-stalk, and is of different figures in different genera.
3. Under

3. Under each floret, or partial flower, is generally placed a single seed.

A compound flower receives different appellations from the figure of its monopetalous florets. When these are all hollow like a tube at the base only, flat in the middle, and expanded towards the top, the flower is said to be *ligulated*, or *lingulated*; that is, composed of florets which resemble a strap, fillet, or tongue, (*Ligula, Lingua.*) This species of compound flower is termed by Ray, *Planipetalus*, and by Tournefort, *Semiflosculosus*, from the semi-florets of which it is made up; and is exemplified in dandelion, hawk-weed, nipple-wort, and several others.

When all the florets are funnel-shaped, that is, hollow almost from bottom to top, the flower is termed by Linnæus *Tubular*, and by Tournefort *Floscular*, to distinguish it from that composed of the semi-florets mentioned above.

Burdock, thistle, saw-wort, artichoke, bastard-saffron, alpine colt's foot, and several other flowers, furnish examples.

Tubular, or hollow florets, are florets properly so called. — Again, when a compound flower consists of florets and semi-florets mixed together, *flosculis ligulatis & tubulosis*, it is called, both by Tournefort and Linnæus, *Flos radiatus*, from the semi-florets which generally occupy the circumference, margin, or outward part of the flower, termed by Linnæus *Radius*, and resemble the rays proceeding from the disk, or body of the sun. The centre of a radiated compound flower, termed by Linnæus *Discus*, is always composed of florets properly so called: the circumference, (*Radius*,) generally of semi-florets, as in milfoil; sometimes, of tubular, or hollow florets unlike those of the centre, as in blue bottle. In mugwort, and cudweed, the partial flowers in the circumference are naked; that is, want petals altogether.

The florets and semi-florets of a compound flower, are generally very numerous. In the following examples, they consist of a determinate number.

Wild lettuce consists of five semi-florets.

Hemp-agrimony with a fig-wort leaf, of twenty florets.

Hemp-

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Hemp-agrimony with long sage-like leaves, *eupatorium perfoliatum*, of fifteen.

Finger-leaved hemp-agrimony, of five.

Twining hemp-agrimony, of four.

The semi-florets in the circumference, or margin of a radiated flower, are commonly indeterminate in point of number. The following are exceptions.

Arctotis, has twenty.

Dwarf sun-flower, twelve.

Tetragonotheca, and hard-seeded *chrysanthemum*, ten.

Tick-seeded sun-flower, and African-ragwort, eight.

Milfoil, *eriocephalus*, bastard-cudweed, *seriphium*, *figisbeckia*, *melampodium*, *chrysogonum*, and African-marigold, have five.

The genus *milleria* has only one semifloret in the margin ; generally two, and sometimes four florets in the center.

The florets and semi-florets in compound flowers that are not radiated, are generally hermaphrodite, that is, have both male and female organs within the same cover.

In radiated flowers, the florets, which occupy the centre, are all hermaphrodite, or male ; the semi-florets, which constitute the rays, or margin, are always female. *Vide* MASCULUS, FEMINEUS, and HERMAPHRODITUS *Flos*.

The essence of a compound flower, consisting, as we have said, in the union of the *anthers* into a cylinder, the genus *kubnia*, although very nearly allied to hemp-agrimony, and indeed, in every other respect, like a compound flower, is very properly referred, by Linnæus, to a class containing simple flowers, because the anthers are separate and distinct.

All compound flowers are aggregate. *Vide* AGGREGATUS *Flos*.

The common calyx, and common receptacle, though generally present in compound flowers, scarce enter into the number of essential characters. The former is wanting in globe-thistle ; the latter in *milleria*.

Compound flowers which constitute the 12th, 13th, and

14th classes in Tournefort's Method, are all reduced to the class *Syngenesia* in the Sexual System. *Vide* SYNGENESIA.

COMPOSITÆ. The name of a class in Hermannus, and Royen, as likewise of an order in Linnæus's Fragments of a Natural Method, consisting of plants which agree in the general characters above enumerated.

A particular description of this order is given under the article *Syngenesia*, which includes all the compound flowers. *Vide* SYNGENESIA.

The most accurate and complete observations on this difficult class of plants, are those of Vaillant, and Pontedera, particularly the former, who confining his researches to that part of the vegetable kingdom, published his discoveries and method of arrangement in the Memoirs of the Academy of Sciences at Paris, from 1718 to 1722. This method, which consists of four sections, and is constructed from the disposition of the flowers on the foot-stalks, includes not only the compound flowers properly so called; (I mean those which answer to the description given above,) but likewise all flowers which, like teasel and scabious, form a head, and are contained within a common calyx, or flower-cup. The four sections just mentioned, are subdivided into twenty-three subaltern sections, from the figures of the common and proper calyx, and common receptacle; from the division of the stem, or stalk; from the number and regularity, or irregularity of the petals; from the crown of the seeds; and from the substance of the fruit.

Pontedera, in one of his Botanical Dissertations, divides, like Tournefort, the family of the compound flowers, which he terms *Conglobati*, into three classes; those with semi-florets; those with florets; and those with a mixture of both. These classes, which are subdivided into 24 sections, from an attention to the figure of the common receptacle, and of the partial, or proper calyx of each lesser flower, would have been true natural divisions, if the author had not, like Vaillant, improperly introduced into the second, scabious, teasel, and blue daisy, which are entirely foreign to the family of the compound flowers.

Thus

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Thus we have seen, that former authors arranged the compound flowers, either from the manner in which they are supported on their foot-stalks, as J. Bauhin, Vaillant, Ray, and Johnston; or from the figure and regularity, or irregularity of the petals, as Tournefort, Pontedera, and Rivinus. Linnæus, to preserve the uniformity of his system, has constructed his primary divisions of the compound flowers, from the different sexes of the florets, which he terms *POLYGAMY*. The subaltern divisions are constructed from the figure of the petals, the disposition of the flowers, the *pappus* or crown of the seed, the common receptacle, and other circumstances, which characterize the subaltern divisions in other authors.

CONCEPTACULUM, (from *concipio*) a receiver; a species of seed-vessel, with one valve, which opens from bottom to top on one side, and has no suture for fastening, or attaching the seeds within it. This term occurs in the *Philosophia Botanica*, and the other early works of Linnæus. In the *Delineatio Plantæ*, prefixed to the second part of his System of Nature, and the latest editions of the *Genera Plantarum*, *Folliculus* is substituted in its place. *Vide FOLLICULUS*.

It is exemplified in rose-bay, red jasmine, Virginian silk, dog's-bane, and swallow-wort.

In this species of seed vessel, the seeds are fastened to a receptacle within the fruit, hence called the receptacle of the seeds. *Vide RECEPTACULUM*.

CONGLOBATUS *Flos*, (from *con*, in composition, together, and *globus*, a ball); growing together in form of a sphere, or globe. Pontedera's term for the compound flowers of Tournefort and Linnæus; the flowers forming a head, (*capitati*.) of Ray. *Vide COMPOSITUS Flos, &c.*

CONGLOMERATI *Flores*, (from *con*, together, and *glomus*, a bottom of yarn). Flowers heaped or wound together; flowers that grow on a branched foot-stalk, to which they are irregularly, but closely connected. This mode of inflorescence, as Linnæus terms it, is opposed to that in which the flowers are irregularly and loosely supported on

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their foot-stalks, hence termed a diffuse panicle. *Vide* PANICULA.

The term is exemplified in several of the grasses, particularly in some species of *poa*, fescue-grass, and *agrostis*. *Vide* GRAMINA.

CONGREGATÆ, (*congregare*, to gather together); the 15th class in Professor Haller's Natural Method, consisting of plants which have a number of flowers placed within a common calyx, under each of which is placed a single naked seed. It is exemplified in blue daisy, scabious, and the compound flowers of Linnæus and other botanists. *Vide* COMPOSITUS *Flos*.

CONIFERÆ, (from *conus*, a cone, and *fero*, to bear); cone-bearing plants. The name of the fifty-first order, in Linnæus's Fragments of a Natural Method, consisting of plants, whose female flowers, placed at a distance from the male, either on the same, or distinct roots, are formed into a cone. In this character, the only one expressed in the title, the plants in question seem to be nearly allied to the family of the mosses, from which, however, they are easily distinguished by their habit, as well as by the structure of the male flowers in which the stamina are united below into a cylinder, and distinct at top.

The Genera contained in this Order are seven : viz.

Linnæan Genera.

English Names.

<i>Cupressus</i>	—	—	Cypress.
<i>Ephedra</i>	—	—	Shrubby Horse-tail.
<i>Equisetum</i>	—	—	Horse-tail.
<i>Juniperus</i>	—	—	Juniper.
<i>Pinus</i>	—	—	Fir, Pine, Cedar, Larch.
<i>Taxus</i>	—	—	Yew-tree.
<i>Thuja</i>	—	—	Arbor-Vitæ.

The plants of this order are mostly of the shrub and tree kind, and retain their leaves all the year. Horse-tail is an herbaceous

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herbaceous perennial; some sorts of larch and fir-trees lose their leaves during the winter.

The form of these plants is generally conic, and extremely beautiful, from the disposition of the branches, which cover the stems even to the roots, and extend themselves horizontally, and circularly, like so many rays.

The height of some species of horse-tail does not exceed half a foot; that of some pines approaches to a hundred.

The roots are short, branched, not very fibrous, and extend horizontally.

The STEMS and BRANCHES are cylindric.

The BARK is thin, and split into short slender scales.

The WOOD, except that of the yew-tree, possesses little hardness.

The BUDS are of a conic form, and naked, that is, without scales.

The LEAVES are entire, small, and thick, frequently triangular, and generally pointed. Juniper has a prickly, or thorny leaf.

With respect to situation, they admit of great variety, being either alternate, opposite, placed in whirls round the stem, or collected into small bundles, which proceed from a single point. This last is particularly exemplified in the larch and pine-trees; in the former of which, six or eight leaves, in the latter, from two to five, are produced together all along the stem and branches, out of a very fine membranous sort of sheath. The first leaves, however, of these same trees, are single, and without any sheath, like those of the fir and yew: the young branches too of the larch-tree, which emerge from the middle of the bundles, have their leaves single in like manner.

The leaves are placed upon the branches without any sensible foot-stalk; in horse-tail, and shrubby horse-tail, they form a sheath, or glove, round the stem.

Small STIPULÆ, or scales, are observed at the origin of the young branches of pine and fir-trees; and of the small bundles of leaves of the larch.

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These plants, like the mosses, are not covered with any sort of pubescence, or down.

The FLOWERS in this order, are universally male and female. These, in the fir, pine, larch, cypress, and arbor vitæ, are placed at a distance from each other, upon the same root; in the rest, they are produced upon distinct plants. In the pine, fir, and larch trees, the male flowers are collected into a spike, or cone, at the end of the branches; in the other plants of this order they proceed singly from the wings of the leaves, or the termination of the branches.

The female flowers are generally collected into a cone; in yew-tree, and shrubby horse-tail, they are single, and terminate the branches.

The CALYX of the male flowers is a catkin; of the female, a cone.

The PETALS in this order are wanting; except in the female flowers of juniper, which have three rigid, sharp, and permanent petals.

The STAMINA are in number from three to twenty, and upwards; united by their filaments into a cylinder, or pillar, which rises out of the centre of the calyx.

The ANTHERS are erect, distinct, of a round form, and divided into internal partitions or cells, which, in the different genera, are in number from two to ten.

The SEED-BUDS, in this order, are generally numerous, and placed betwixt the scales of the cone, which serve for a calyx. From each seed-bud arises a very short cylindrical style, crowned with a simple *stigma* of a conic form. These plants have properly no fruit, or seed-vessel; the seeds being naked, and involved only by the scales of the calyx. These scales, which compose the cone, are in the pine, of a bony nature, and almost united; in the fir, larch, arborvitæ, and cypress, they are of a substance like leather; and in juniper they are united, and become fleshy, and succulent like a berry. The calyx, or cone of shrubby horse-tail, becomes likewise a kind of berry, with a slight opening at top, from whence are discovered its two acute, egg-shaped seeds.

seeds. Lastly, from the bottom of the calyx of the female flowers of yew, is produced a coloured succulent receptacle, which surrounds the greatest part of a single oblong seed, and is only open at top.

The SEEDS in this order, being nourished, as in a seed-vessel, by the scales of the cone, or common calyx, differ in nothing from the *germina*, or seed-buds. In pine, fir, larch, and arbor-vitæ, the seeds are hard like a stone, or nut, and crowned with a large, membranaceous wing of an oblong figure, contained within the scales of the cone.

Each seed is furnished with two covers; the external, hard, and bony; the internal, pulpy, of an oval form, white, very thick, and without any aperture.

The female flowers, and consequently the fruit and seeds of the horse-tail, a sort of fern, have not yet been discovered. The fructifications of the male flowers being disposed on the stalks, in form of a cone, possibly determined Linæus to arrange the genus in this natural order.

Most of the cone-bearing plants are resinous, or gummy. These gums have a bitter taste, but a very agreeable smell; witness the incense which proceeds from a species of juniper with yellow fruit. By cutting the trunk, and the largest branches of the common juniper, during the great heats, there flows a gum, called sandarac, which is brought to us from Africa, where the trees grow very large, and in great quantities. This sandarac is called by some, the Arabian sandarac or varnish; by others, the varnish-gum, or gum-juniper, and is of more use to artists, than in physic.

From the larch-tree is extracted what we erroneously call Venice-turpentine. This substance, or natural balsam, flows, at first, without incision; when it has done dropping, the poor people who wait in the fir-woods, make incisions at about two or three feet from the ground, into the trunk of the trees, into which they fix narrow troughs, about twenty inches long. The end of these troughs is hollowed, like a ladle; and in the middle is a small hole bored, for the turpentine to run into a receiver, which is placed below it. As the gummy substance runs from the trees, it passes along the

sloping gutter, or trough, to the ladle, and from thence runs through the holes into the receiver. The people who gather it, visit the trees morning and evening, from the end of May to September, to collect the turpentine out of the receivers. When it flows out of the tree, Venice-turpentine is clear like water, and of a yellowish white; but, as it grows older, it thickens, and becomes of a citron colour. It is procured in greatest abundance, in the neighbourhood of Lyons, and in the valley of St. Martin, near Lucern, in Switzerland.

From the wild pine, or pineaster, is extracted the common turpentine, which is chiefly used by the farriers, and from which is distilled the oil of that name. The finer and more valuable part of the distillation comes first, and is called the spirit; what is left at the bottom of the still, is the common resin.

The pitch-tree, a species of fir, produces the substance from which it derives its name.

From the white and black spruce firs of North-America, oozes a fine clear turpentine, of a strong scent, with which the native Indians are said to cure green wounds, and some internal disorders. That particularly of the first sort, called by Charlevoix, *Epinette Blanche*, or white prickly fir, is affirmed to be a sovereign remedy in fevers, and pains of the breast and stomach.

The large branches of the larch-tree, besides its turpentine, produce several small grains like sugar, which possessing the purgative quality of manna, have likewise obtained its name.

Taken internally, these plants are aperient, sudorific, diuretic, stomachic, and antiseptic. An air impregnated with their balsamic exhalations, is reckoned very salutary to consumptive habits.

Juniper berries, and the gum of the larch, give urine a fragrant smell like that of violets. The cones, or female heads of the cypress, improperly called cypress-nuts, are highly astringent. Juniper-wood is fragrant when burnt: for which purpose it is frequently used in houses, to prevent pestilential disorders, and other infections.

Applied

Applied externally, the resins, particularly those of the pitch and larch trees, are anodyne, deterfive, and antiseptic. By its bitterness, the oil of juniper effectually destroys worms. A decoction in milk, of the nuts or seeds of the wild pine, otherwise called pineaster, or of the extremities of the branches pulled in spring, is said, with a proper regimen, to cure the most confirmed and inveterate scurvy. A decoction of juniper-berries, is proper for fortifying the stomach; that of the wood is employed, like a decoction of *sassafras*, to promote sweat, and purify the blood. The same medicine, with crude antimony, cures that stage of the venereal disease in which the face is entirely covered over with ulcerous pustules. Half an ounce of Venice-turpentine mixed in a clyster, prevents a mortification in putrid and contagious dysenteries. The same substance is specific in suppressions of urine.

From the seeds or nuts of the cultivated pine, is drawn by expression an oil, which is equal, in point of excellence, to that obtained from hazel-nuts. These same nuts or kernels are frequently served up in desserts, during the winter-season, in Italy; formerly they were used in medicine in this country; but of late years, the pistacia nuts have been generally substituted in their place. Of the soft white substance, commonly called *alburnum*, which, in trees, lies betwixt the wood and inner bark, the Swedes prepare a dish that is esteemed a great delicacy, and much used in spring. In times of scarcity a kind of bread is made of the bark. The natives of Siberia too, we are informed by Gmelin, make great culinary use of the *alburnum* of the young pines, which, for that purpose, they collect with care, dry, reduce into powder, and mix, as a pleasing and salutary ingredient, in their common food.

Of juniper-berries, and the tops of the branches of a species of Canadian pitch-tree, is prepared a very safe and wholesome wine.

The wood of the cone-bearing plants is, in general, tender, light, not liable to corrupt, and of a fragrant smell. That of the yew-tree is very hard, pliant, susceptible of a good
polish.

polish, and possesses a red colour, which, for beauty, may vie with any of the foreign woods.

The white Canadian pines, says Charlevoix, shoot out, at the upper extremity, a kind of mushroom, which the natives call *Guorigue*, and use with success against disorders of the breast, and in dysenteries.

Of the four sorts of Canadian firs, enumerated by the same author, the white prickly kind, and that called *La Perusse*, are excellent for masts, especially the first, which is also extremely fit for carpenter's work.

The sort termed *La Perusse*, is gummy, but yields not a quantity sufficient to be made use of; its wood remains long in the ground without rotting, which renders it extremely fit for paling, or inclosures. The bark is excellent for tanners, and the Indians make a dye of it, resembling that of a Turkey blue.

The branches of the white and black spruce-firs, are used by the inhabitants of North America, in making the beer, hence commonly known by the name of spruce-beer.

The island of Cyprus, is said to have received its name from the cypress-trees, which grow there in very great abundance.

The timber of the horizontal cypress, a native of the Levant, is said to resist worms, moths, and all putrefaction; and to last many centuries. The coffins in which the Athenians used to bury their heroes, were made, says Thucydides, of this wood, as were likewise the chests containing the Egyptian mummies. The doors of St. Peter's church at Rome were originally of the same material. These, after lasting eleven hundred years, at the end of which time they discovered not the smallest tendency to corruption, were removed by the order of Pope Eugenius the fourth, and gates of brass substituted in their place.

The same tree is by many eminent authors recommended as meliorating the air by its balsamic and aromatic exhalations; upon which account, many of the ancient physicians of the eastern countries used to send their patients,

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who were troubled with weak lungs, to the island of Candia, where these trees grew in great abundance, and where, from the salubrious air alone, very few failed of a perfect cure.

In the same island, says Miller, the trees in question were so lucrative a commodity, that the plantations were called *Dos Filia*, the felling of one of them being reckoned a daughter's portion.

Cypress, says Mr. Pococke, is the only tree that grows towards the top of Mount Lebanon, and being nipped by the cold, does not grow spirally, but like a small oak.

The leaves of common favin, a species of juniper, are much used by farriers for destroying worms in horses.

The red wood of Bermudas Cedar, the *Juniperus Bermudiana* of Linnæus, commonly known in England by the name of cedar wood, is used for making pencils, as likewise for wainscoting rooms, and making stair-cases. It is remarkable that the worms are never found to eat the bottoms of vessels built with this wood, as they do those built with oak; so that for purposes of traffic in the West-India seas, cedar ships are preferable to all others; but they are not equally fit to be employed as ships of war; the wood being so brittle as to split to pieces with a cannon-ball.

The peasants in Switzerland make torches for burning, of the wood of a mountain pine, which grows naturally in that country, and is hence denominated the torch pine.

Cedar of Lebanon is the *Pinus Cedrus* of Linnæus, and the *Larix Cedrus* of Tournefort. The truth is, that this curious tree bears the leaves of the larch; but as the fir, pine, larch, and cedar, are all arranged by Linnæus, under the genus *Pinus*, he could not, without erecting a new genus, make the cedar, in any other respect connected with the larch, than as they were both species of the same genus.

The wood of this celebrated tree, which grows naturally on Mount Libanus, in Syria, and no where else, is accounted proof against all putrefaction of animal bodies; and said to yield an oil, excellent for preserving books and writings. It is thought by Lord Bacon, to continue sound a thousand years.

years. The statue of Diana, in the famous temple at Ephesus, is affirmed to have been of this valuable material, as was most of the timber-work of that wonderful structure. In the temple of Apollo at Utica, there was found cedar-wood near two thousand years old.

The largest cedar, mentioned by Dr. Pococke, measured twenty-four feet in circumference.

For particulars concerning this curious plant, the reader is referred to Pococke's, Rauwolf's, Le Brun's, and Maundrel's Travels.

The wood of a pitch-tree with an erect fruit, which the natives of Provence term *Serento*, is preferred to every other, for making violins, and other stringed musical instruments.

CONTORTÆ, (from *con*, together, and *torqueo*, to twist;) twisted plants. The name of the thirtieth order in Linnæus's Fragments of a Natural Method, consisting of plants which have a single petal that is twisted or bent towards one side.

List of the Genera contained in this Natural Order.

S E C T I O N I.

Plants with twisted Flowers, having five Stamina, and one Style.

Linnæan Genera.

English Names.

Cerbera.

Echites.

Gardenia, — — Cape Jasmine.

Genipa.

Macrocnemium.

Nerium, — — Oleander, or Rose-Bay.

Periploca, — — Virginian Silk.

Rauvolfia.

Tabernæmontana.

Vinca, — — Periwinkle.

S E C T I O N II.

Plants with twisted Flowers, having five Stamina, and scarce any Style.

Apocynum, — — Dog's-bane.

Asclepias,

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Linnæan Genera.	English Names.
<i>Asclepias</i> , —	Swallow-wort.
<i>Cameraria</i> .	
<i>Ceropegia</i> .	
<i>Cynanchum</i> .	
<i>Plumeria</i> , —	Red Jasmine.
<i>Stapelia</i> , —	Succulent swallow-wort.

Habit and Structure of the Plants of this Order.

This order furnishes trees, shrubs, and fat succulent plants, some of which retain their leaves during the winter. The herbaceous vegetables in this order are generally perennial.

The **ROOTS** are sometimes branched; commonly fleshy, and garnished with fibres, or strings, like those of turnep.

The **STEMS** are round, and in some genera, pulpy.

The **BRANCHES** are sometimes placed alternate, sometimes opposite. In *cynanchum*, *ceropegia*, and Virginian-silk, they are twisted like those of convolvulus to the left, in a direction opposite to the apparent diurnal motion of the sun.

The **BUDS** are of a conic form, and naked, or without scales.

The **LEAVES** are sometimes alternate, sometimes placed opposite in pairs; and not seldom surround the stem in whirls. They are attached to the branches by a cylindrical foot-stalk, which is short, and frequently united to the foot-stalk of the opposite leaf. In the genus *stapelia*, which consists entirely of fat succulent plants, the leaves are nothing else than certain protuberances of a conic form, that are produced on the sides of the branches, and spread open horizontally, ending in acute points. In some other genera of this order, when the stalks are very old, the leaves become so small, as frequently to elude the sight. At the origin of the foot-stalk of the leaves, in some species of dog's-bane, and swallow-wort, are produced two or three very small *stipulæ*, or scales, on each side of the branches. Two pretty large scales

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scales of the same kind, are observed in some species of *tabernæmontana*.

The defensive and offensive weapons in this order are a downy sort of pubescence, and simple, or forked prickles, which, in some genera, issue from the wings, or angles, of the leaves.

The FLOWERS are hermaphrodite, and stand either singly upon their foot-stalks, as in periwinkle; or are collected into umbels, and clusters, (*corymbi*); as in *tabernæmontana*, and *cameraria*. These bunches, or collections of flowers, sometimes terminate the branches, as in red jasmine; sometimes proceed from the angles of the branches, or leaves, as in *tabernæmontana*, and *echites*; and sometimes stand at the side of the wings, without issuing from them, as in swallow-wort, *flupelia*, Virginian-silk, and *cynanchum*.

The FLOWER-CUP is composed of one leaf divided almost to the base into five unequal segments which embrace each other, and are permanent; that is, accompany the seed-bud to its maturity.

In the genus *cerbera*, the flower-cup consists of five distinct spreading spear-shaped leaves.

The COROLLA, or coloured inner cover of the flower, consists of one petal, which in the different genera, is bell, salver, funnel, or wheel-shaped.

The LIMB, or upper spreading part of the petal, is generally divided into five equal parts, which are slightly bent or twisted to the left, and embrace, or infold one another, like the petals of the mallow-tribe. *Vide COLUMNIFERÆ*.

The TUBE, or lower hollow part, is generally long, and cylindrical; sometimes club-shaped, as in *cerbera*; and not seldom wanting, as in swallow wort, dog's-bane, Virginian-silk, and some others.

In several flowers of this order the petal is accompanied with a *nectarium*, which, however, in the different genera, assumes very different appearances. In oleander, it is a short crown divided into a number of capillary segments, which
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seem rent and terminate the tube of the petal. In *slapelia*, it is a star composed of five rays, with ragged points, which surround the organs of generation. In *echites*, and *tabernæmontana*, it consists of five glands, which are placed round the *germen*, or seed-bud. In *cynanchum* it stands erect in the centre of the flower. In Virginian-silk, it is very small, cut into five indentments, or teeth, at the brim, and surrounds the chaps, *faux*, of the petal. In dog's-bane, it is composed of five small oval bodies, which rise from the bottom of the flower, and surround the seed-bud. Lastly, in swallow-wort, the *nectarium* is composed of five singular ear-shaped bodies, placed within the petals, from the bottom of each of which issues a sharp horn, bent towards the parts of generation, and resembling a filament without its top. Besides this very singular appearance, the male and female organs are entirely eclipsed by means of a scaly covering which opens every way, and is termed by Linnæus, *corpusculum truncatum*.

The STAMINA are five in number, short, equal, attached at the same height to the tube of the petal, alternate with its divisions, and opposite to those of the calyx.

The ANTHERS are generally erect, and frequently approach so as to form a compact body in the middle of the flower. In oleander they are arrow-shaped, and terminated by a long thread. In dog's bane, they are divided in two at the base; and in *slapelia*, or succulent swallow-wort, they are slender, and fastened on each side the filament.

Gardenia, and swallow-wort, have no filaments; in the latter the tops are inserted into the scaly covering mentioned above.

The SEED-BUD is either single, as in oleander, or double, as in periwinkle. In *genipa*, *gardenia*, and *macrocnemum*, it is placed below the receptacle, or seat of the flower. *Vide GERMEN inferum*.

The STYLE is wanting, or scarce perceptible in plants of the second section; single in those of the first, and generally common to two seed-buds.

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The STIGMA, or summit of the style is frequently double, as in periwinkle, and red jasmine.

The SEED-VESSEL in some genera, is a pulpy fruit, of the berry and cherry kind; as in *genipa*, *rauvolfia*, and *cerbera*: but most frequently that species termed by Linnæus *conceptaculum*, and *folliculus*, which has one valve, or external inclosure, opens lengthways on one side, and has not the seeds fastened to it. Two of these dry fruits with a single cell, compose the seed-vessel of most plants of this order.

The seed-vessel in *gardenia*, is a dry berry; in *macrocnemum*, a capsule with two cells.

The SEEDS are generally numerous, and in several genera crowned with a long *pappus*, or downy wing, like that of the compound flowers, by means of which they easily disperse, and sow themselves. This down is particularly conspicuous in dog's-bane, swallow-wort, *flapelia*, Virginian-silk, *echites*, and oleander.

The plants of this order being cut, emit a juice which is generally milky, as in dog's-bane; sometimes of a greenish white, as in swallow-wort and periwinkle. From the circumstance of their abounding in this milky juice, the greatest part are deemed poisonous; repeated observations having established this aphorism, that milky plants, except those of the plain compound flowers, as the dandelion, and nipple-wort, are generally of a baneful destructive nature, and ought, at least, to be administered with caution. The most dangerous plants in this order are those of the following genera, *rauvolfia*, *cerbera*, red-jasmine, *tabernæmontana*, Virginian-silk, dog's-bane, *cynanchum*, and *ceropegia*.

With respect to their sensible qualities, they are bitter, particularly the seeds, roots, and bark, in which resides their principal virtue. An infusion of any of these parts in cold water, taken in very small quantity, is innocent, and purgative; if the dose is augmented, it becomes emetic; and if still increased, mortal.

The milky juice which flows from the stalks and leaves of all the species of dog's-bane, is supposed to be hurtful, if
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taken inwardly ; but does not raise blisters on the skin, as the juice of spurge, and other acrid plants. The down, or cotton, which surrounds the seed, is used in France for the stuffing of easy chairs, and making quilts, which being extremely light and warm, are a very proper covering for persons afflicted with the gout.

A species of *Asclepias*, commonly termed Egyptian dog's-bane with flowers growing in a spike, probably the *asclepias gigantea* of Linnæus, grows plentifully near Alexandria, and produces a cotton or down which is used as fur, to adorn the robes of persons of quality. The leaves of this plant, says Lemery, being stamped, and applied as a cataplasm, are reckoned proper to resolve cold tumours. The juice makes the hair come off; and, used externally, is a remedy for disorders of the skin; but given inwardly, is a poison: for it purges with such sharpness and violence, as to cause bloody-fluxes that prove mortal. The leaves are a poison to dogs, wolves, sheep, and other animals.

Common swallow-wort, another species of *Asclepias*, which, from its supposed virtue, has obtained the names of *vincetoxicum*, Le Domte-venin, vincetossico, and tame-poison, all expressive of an imagined alexipharmic quality, is a perennial herb, which grows plentifully on sandy mountains, and in the clefts of rocks in most parts of Europe; but, though a native of Sweden a more northerly climate, (as Linnæus particularly attests) has not yet, as far I can learn, been discovered to be an indigenous production of any part of Britain. The roots are acrid and bitter to the taste, and though by many esteemed, as the names just mentioned import, an excellent counterpoison, yet want not suspicious marks of a very opposite and noxious quality. The fresh-gathered roots so much resemble in their effects those of apocynum, or common dog's-bane, that, according to Haller, they provoke vomiting. Linnæus likewise affirms, in his *Materia Medica*, that the roots of swallow-wort are poisonous in a small degree. By many they were much commended for their singular efficacy in promoting sweats, and for other properties in various diseases, particularly in malignant fevers, in which, the decoction of an

ounce in a pint of common water, was accounted to be preferable to scorzonera.—But as there are medicines which, in all such cases, may very properly be administered, and with, at least, an equal chance of success, it would, perhaps, be better, unless under the guidance of superlative medical ability, to abstain altogether from those suspected roots.—The plant, when frost-bitten, is fed upon by horses; at other times they refuse it.

Greater Syrian dog's-bane, the *Apocynum Syriacum* of Clusius, the *Asclepias Syriaca* of Linnæus, is a biennial or perennial herb, which grows naturally in Syria and Egypt, as likewise in Virginia, and some other parts of North America. The white silky or downy substance which crowns the seeds, M. La Rouviere, an ingenious Frenchman of the last century, discovered the secret of spinning into regular balls like those of silk; and in consequence of his useful invention, obtained a patent or decree of council from the then French government, authorizing him to fabricate from this new prepared substance, velvets, flannels, and other stuffs.

The false or bastard ipecacuanha, a poisonous root brought out of America for the true ipecacuanha, and sometimes unhappily administered as such, is the root of a species of swallow-wort, termed by Linnæus, *asclepias curassavica*. The two roots, however, may be easily distinguished; that of the bastard kind is composed of a great number of small fibres; whereas the true plant of that name has jointed fleshy roots, which run deep into the ground.

The wood of the ahouai, a species of *cerbera*, which grows naturally in Brazil, and the Spanish West-Indies, stinks most abominably; and the seeds, or kernels, are a strong emetic poison. The Indians know of no antidote to expel this poison, and are so cautious, that they never use the wood of the tree for fuel. The stones (for the fruit is of the cherry kind,) they employ in their dances to make a gingling sound, like the small shells of ivory, or hard wood, termed castanets, or snappers, used for the same purpose by dancers of sarabands in Spain, and other parts of Europe.

Another species of *Cerbera*, which grows plentifully in the

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the East Indies, and is termed by Linnæus, after Bauhin and Ray, *Cerbera Manghas*, abounds with a caustic milk, which, notwithstanding, if properly prepared, proves, says Burman, an excellent medicine in dropfical cases, in which it operates both as an emetic and cathartic. The leaves of this plant are like those of oleander; the flowers have the appearance and fragrance of jessamine; the fruit, in shape, resembles a peach, and in colour, an orange.

Round-leaved Montpellier scammony, a species of *cynanchum*, abounds with a milky juice, which is of a purgative nature, and when concreted, has been frequently sold for true Aleppo scammony.

All the species of rose-bay, or oleander, are supposed to have a poisonous quality; the larger branches, when burnt, emit a very disagreeable smell, which generally indicates something noxious. Galen relates, that the common oleander, taken internally, is deadly; and some late observations have evinced, that the water in which the leaves are macerated, is a mortal poison to sheep. Notwithstanding these facts, more noxious qualities have been ascribed to this genus of plants than fall to its share. The honey about Trebifond is reckoned very unwholesome; occasioned, as some suppose, by the bees extracting it from the flowers of the oleander: but this is entirely a mistake; for, Tournefort has fully informed us, that it is not from the flowers of oleander, but from those of a species of *chamærhododendros*, the *azalea pontica* of Linnæus, that the noxious juice in question is extracted.

Xenophon having related, in the fourth book of the Expedition of the younger Cyrus, that, “on the march of the Greeks from Upper Asia, such of the army as partook of the honey in a place near *Trapezus*, now Trebifond, on the Euxine, where there was a great number of bee-hives, were affected with very disagreeable symptoms, such as vomiting, purging, and even insanity; that not one was able to stand erect; that those who had indulged but little in this pernicious dainty, seemed intoxicated; whilst such as had been more liberal in the use of it, either appeared frantic, or lay as dead; and that, in short, though, about the same hour in the

following day, they had a partial recovery of their senses, they were not, however, completely restored till some days after :”—M. Tournefort, in his Travels through the Lesser Asia, and especially Pontus, the scene of this transaction, was led to pay particular attention to the narrative of the Greek Historian, and finding, upon minute enquiry, that the plant mentioned above, which he denominates *Chamærhododendros pontica, maxima, mespili folio, flore luteo*, and which grows plentifully about Trebisond, and the vicinity, produces the very effects related by Xenophon, and that violent head-achs are occasioned even by its smell, he concludes, with the greatest probability of truth, that the honey which proved so noxious a refreshment to the Greek army, had been extracted by the bees from the plant in question ; and, in corroboration of his conclusion, adduces the testimony of Father Lamberti, a Missionary, who observes, that the honey collected by the bees from a certain shrub, which, from the description given of it by Lamberti, Tournefort pronounces to be the medlar-leaved *Chamærhododendros*, and which grows commonly in *Colchis* or Mingrelia, a country adjoining to Pontus, is highly pernicious, and, in particular, excites vomiting. It is added by the Reverend Father, that the smell of the flowers of this shrub bears a great resemblance to that of honey-suckle, but is much stronger. *Memoires de l'Academie Royale des Sciences*, 1704.

Dr. Hasselquist, in his Travels to the East, speaking of oleander, which grows in great abundance in Egypt and the Eastern countries, mentions not one suspicious character, but asserts, on the contrary, that it possesses all the qualities of the tree of the righteous, commemorated by David in the first psalm.

The bark of a species of Malabar oleander, termed *codagapala* by the natives, is mentioned by Adanson, as a specific in violent dysenteries.

The milky juice of all the species of red jasmine, (*Plumeria*,) is extremely caustic. If, in cutting off any of the branches of these plants, the knife is not immediately cleaned, the juice will suddenly corrode it, and in a very little time,

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time, turn the blade almost black. The same substance dropped on linen, has the effect of the strongest aqua-fortis.

The powdered bark of a species of African swallow-wort, termed by the natives *beidelsar*, mixed with charcoal of the same root, is an excellent caustic. An infusion in cold water of this root is employed with success against the bites of serpents, and other venomous creatures.

The tender shoots of *Asclepias Syrica*, notwithstanding the suspicious nature of the plant, are sometimes used for the kitchen, and prepared like Asparagus. From the flowers, the French, when in possession of Canada, where it grows in great abundance, extracted a sugary substance, of a brown colour, and affirmed by Kalm to be very agreeable to the taste. These flowers, when in full bloom, impregnate the air with their fragrant exhalations, and render walking or travelling in the woods, especially in the evening, peculiarly delightful. For the purpose of making the sugar just mentioned, they must be gathered in the morning, when they are covered over with dew.

The milky juice of *Apocynum Androsæmifolium*, is said to be noxious to some persons, and harmless to others, a quality which has likewise been ascribed to the *Rhus Vanix*, or poison-ash. "I saw a soldier," says Kalm, in his Travels into North America, "whose hands were blistered all over, merely by plucking the plant in order to shew it me; and its exhalations, it is affirmed, affect some people when they come within reach of them. As for my part," he continues, "it has never hurt me, though, in presence of several people, I have touched the plant, and rubbed my hands with the juice till they were white all over; and I have often rubbed the plant in my hands till it was quite crushed, without feeling the least inconvenience. In general, however, the lactescent juice of this plant not only swells any part of the body on which it is spread, but frequently corrodes the skin."

Of the filaments of the stalk of *Apocynum Cannabinum*, the North American Indians make ropes, which they employ as bridles, and for fishing-nets. These ropes are said to be

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stronger, and to keep longer in water, than such as are made of common hemp. "On my journey," says Kalm, "through the country of the Iroquois, I saw the women employed in manufacturing this hemp. They made use neither of spinning wheels nor distaffs, but rolled the filaments upon their bare thighs, and made thread and strings of them, which they dyed red, yellow, black, and of other colours, and afterwards worked them into stuffs, with considerable ingenuity." Sometimes the fishing tackle of the Indians consists entirely of this hemp.

CONUS, (Gr. *Κωνος*,) a cone. A species of fruit or scaly seed-vessel so termed by Tournefort, and other botanists. Linnæus has substituted STROBILUS in its place, which see.

CORCULUM, (a diminutive from *cor*, the heart); a little heart. The essence of a seed, and principle of life of the future plant, attached to and contained within the lobes. It consists of two parts, termed by Linnæus *Plumula* and *Rostellum*. The former is the *radicula* of Grew and other naturalists. *Vide* PLUMULA, and ROSTELLUM.

The *Corculum* is, in fact, the embryo of the future vegetable; and is attached by two trunks of vessels to the lobes at their union. The first of its two parts mounts upwards, and becomes the trunk. The other strikes into the ground, and is the rudiment of the root. The lobes and heart of the seed are distinctly visible in the bean, and other seeds of that class, especially after remaining some time in water, or earth. *Vide* COTYLEDONES, and GERMINATIO.

The principle of life is seated either at the summit or base of the seed. From this circumstance are constructed the two first classes in Cæsalpinus's Method, containing trees and shrubs only.

COROLLA, (diminutive from *corona*, a crown); a little crown, chaplet, garland, or wreath:—Linnæus's name for the beautiful coloured leaves of the flower, which stand within the calyx, and are supported by it.

This conspicuous and principal part of the fructification is defined to be the expansion, or continuation, of the fine

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inner bark of the plant, and consists of two parts, the petal, and *nectarium*; the last of which, however, is rather a striking superfluity, or occasional appendage, than a necessary part of every flower.

The petals, says Tournefort, are those leaves which generally excel the other parts of the plant in beauty, and colour, and never, like the flower-cup, become a cover or vessel to the seed.

These characters serve in most cases to distinguish the *corolla* from the *calyx*; but the petals, as in passion-flower, are not always coloured; and the tube of the petal, in the genus *selago*, incloses, or involves, the seed. In such doubtful cases as these, we must have recourse to a more certain mark of distinction; and it is this. The petals, and stamina, are always ranged alternately; the divisions of the calyx and stamina are placed opposite. This rule determines with precision in such flowers as want either the calyx, or petals. Thus, in pellitory, wild orach, and nettle, one of the two covers is wanting. Which is it? Am I to infer that the single cover present is the *corolla*, because the finer and more principal part? Nothing would be more erroneous than such an inference; many flowers, as water-purslane, *ruellia*, and bell-flower, which generally have both covers, are found occasionally to lose the petals, but never the calyx. How then am I to proceed? Apply the rule mentioned above. I do so, and finding the divisions of the only cover that is present, to stand opposite to the stamina, I conclude that cover to be the calyx.

That the rule just mentioned is founded in the natural situation of the parts in question will appear, by examining any number of complete flowers in the fourth and fifth classes of Linnæus's Sexual Method. In the former of these classes, the number four, in the other, the number five, is predominant; and, as both covers are present, the opposition and alternation alluded to, become distinctly visible.

The petal, which, as we have said, constitutes the principal part of the corolla, surrounds both organs of gene-

ration ; and consists either of one piece, as in lily of the valley ; or of many, as in the tulip. In the first case, it is called a monopetalous corolla ; in the second, polypetalous, from the Greek numerals, *μονος*, *solus*, *unicus*, single, and *πολυσ*, *multus*, many, compounded with *petal*, a word of the same origin. A flower which has no petals, is termed by botanists, apetalous. *Vide APETALUS Flos.*

The lower hollow part of a corolla of one petal is called the tube ; the upper spreading part, the limb ; the opening of the tube, the chaps, or jaws, (*faux*.)

A bell-shaped flower, *corolla campanulata*, (*campana*, a bell,) consists of one petal, which is regular, hollow like a bell, and nearly of the same width throughout. Of this kind are bind-weed, deadly night-shade, dog's-bane, and bell-flower. Linnæus affirms, that the bell-shaped petal wants the tube. I should rather be inclined to assert, that it wants the limb, or upper spreading part ; for if tube means any thing, it must mean something hollow.

A funnel-shaped flower, *corolla infundibuliformis*, (*infundibulum*, a funnel,) has one regular petal, whose limb is shaped like a cone, and rises from a long tube. Tobacco, oleander, thorn-apple, and hen-bane, furnish examples.

A salver-shaped flower, *corolla hypocrateriformis*, (*ὑπο*, *sub*, under, and *Κερατρε*, *crater*, a bowl, goblet, or cup,) has a plain, or flat spreading limb standing on a short tube, as in periwinkle, bastard lychnis, and *androface*.

A wheel-shaped flower, *corolla rotata*, (*rota*, a wheel,) consists of a single regular petal, which, like the former, has a flat, or plain limb, but wants the tube altogether. This is exemplified in borage, loose-strife, pimpernel, and mullein.

A gaping-flower, *corolla ringens*, consists of one irregular petal, shaped sometimes like a masque, as in birth-wort, and sometimes terminated by a tube below, and divided into two lips above ; as in lion's-tail, and dead nettle. The gap, or opening between the two lips, is termed by Linnæus, *riktus*, a gaping, or grinning. The upper-lip is wanting in germander.

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Most of the flowers in the class *Didynamia* of Linnæus are of the gaping kind.

The lower tapering part of each petal, in a flower consisting of many petals, is termed the claw, *unguis*; the upper spreading part, the *lamina*.

A cross-shaped flower, *corolla cruciformis*, (*crux*, a cross,) consists of four petals that are nearly equal, and spread at top upon claws the length of the calyx, in form of a cross. It is exemplified in stock gilly-flower, moon-wort, lady's-sinock, candy-tuft, and the other flowers of the class *Tetradynamia* of Linnæus.

A pea-bloom, or butterfly shaped flower, *corolla papilionacea*, (*papilio*, a butter-fly,) is composed of four or five irregular petals; the uppermost of which resembling a standard, is, for that reason, termed *vexillum*; the lowermost, sometimes divided in two, resembles the keel of a ship, and is hence called *carina*; the two side petals, termed *alæ*, or wings, stand single, involve the keel, and are generally furnished at their origin with two appendages resembling ears.

The term is exemplified in pea, lupin, vetch, laburnum, and the other flowers in the class *Diadelphia* of Linnæus. These flowers, from the nature of their fruit, were long denominated leguminous. Cordus was the first who distinguished them by the name of papilionaceous, from their obvious resemblance to a butter-fly.

Lastly, an irregular flower properly so called, consists of several irregular and dissimilar petals, which are generally accompanied with a *nectarium*. Of this kind are the aconite, violet, fumatory, lark-spur, bee-flower, orchis, fraxinella, balsam, and some others.

The number of petals is determined from the base of the corolla; the number of segments, or divisions, from the middle of the limb, or upper spreading part of the petal. Rivinus's rule on this head, is to reckon as many petals, as the parts into which the flower when it falls, resolves itself. By this criterion, which seems, in general, to be very exact, are the flowers of wood-forrel, speedwell, pimpernel, wild-rosemary, and *trientalis*, discovered to consist of one petal,

petal, though the divisions are so deep, and slightly connected, that they assume the appearance of so many distinct petals.—Exception. The flower of *Vaccinium Oxycoccus* is resolved into four distinct leaves, which formerly were one.

Tournefort reckons the flowers of the mallow-tribe monopetalous: Linnæus, pentapetalous.

Of polypetalous flowers, some consist of two petals, as enchanter's night-shade, (*circæa*) and *commelina*; some have three, as Virginian spider-wort, and water-soldier; some four, as stock gilly-flower, and the other cross-shaped flowers; some five, as marsh-marigold, pæony, and the umbelliferous flowers; others six, as tulip, lily, and May-apple; some nine, as tulip-tree, and a species of tea according to Dr. Hill; and some consist of an indefinite number, as water-lily, and globe ranunculus.

Segments, or divisions, are very frequent in flowers of one petal, which generally have their limb, or upper spreading part, cut into five. In flowers that have more than one petal, these divisions are more rarely to be found. The following are among the most remarkable instances of this kind; chick-weed, and enchanter's night shade, have each petal divided in two; *holosteum*, and *hypercium*, in three; campion, in four; and bastard-rocket, in five.

In respect to figure, the petals are either waved, as in superb lily; plaited, as in bind-weed; rolled, or turned back, as in fow-bread, and climbing African asparagus; or twisted and bent to one side, as in swallow-wort, oleander, periwinkle, Virginian-silk, and the other genera of the natural order *Contortæ*. *Vide* CONTORTÆ.

In *Trientalis*, the petals lie over one another like tiles; one side of each folding over the next towards the right. In gentian, the petals, before they are unfolded, lie over each other in a direction contrary to the sun.

In respect to equality, the petals and segments are either equal, when the parts are regular and equal in figure, magnitude, and proportion, as in primrose, *limosella*, privet, lilac, and jessamine; unequal, when the parts answer in proportion,

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portion, but not in magnitude, as in flowering-rush; or irregular, when the parts of the limb differ in figure, magnitude, or proportion, as in aconite, lupine, and dead-nettle.

The margin, or brim of the petals, is either sawed, as in linden-tree, and water plantain; beautifully fringed, as in buck-bean, rue, and Indian cress; notched, *crenata*, as in flax; jagged, or indented at the bottom of each division, as in round leaved water pimpernel, and iron-wood; or covered with a fine downy hair, as in buck-bean, and a species of St. John's-wort.

In lily, thorn, and *brunfelsia*, the corolla is very long; in *centunculus*, and currant-tree, very short.

The base of the corolla is generally placed close to the flower-cup; in a very few genera, as marvel of Peru, tuberous moschatel, and greater wild burnet, the seed-bud is interjected betwixt them.

With respect to duration, the petals sometimes fall off immediately after their expansion, as in herb-christopher, and meadow-rue; sometimes wither on the stalk without dropping, as in bell-flower, orchis, cucumber, gourd, and bryony; sometimes continue till the fruit has attained maturity, as in water-lily; but most commonly fall off with the stamina, and other parts of the flower, before the ripening of the fruit.

In all the plants where the calyx makes no part of the seed-bud, but is separated from it, the corolla, when attached to the former, consists of several distinct pieces; and the calyx is always of one leaf.

This aphorism being previously established, serves to ascertain the insertion of the corolla in plants, where, as in the rose, apple, and medlar, the calyx makes part of the seed-bud, and it is impossible to decide by the eye, whether the corolla is attached to the calyx, or the common receptacle. In such cases we must be guided by analogy; and if the flower consists of many petals, conclude that they are inserted, each by its claw, into the calyx; if of one petal only, into the common receptacle.

Among the most striking singularities in the situation of the

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the petals, may be reckoned that of eriocaulon, in which the corolla, as well as calyx, are placed under the seed-bud.

In assimilating the animal and vegetable kingdoms, Linnæus distinguishes the corolla by the name of *aulæum floris*, (or curtains of the bed) in which the nuptials of the plant are celebrated. *Vide Phil. Bot. p. 92.*

In the different species of winter-green, tobacco, gentian, speedwell, geranium, hyacinth, narcissus, scabious, primrose, buck-bean, andromeda, and whortle-berries, the petals differ considerably in point of figure.

Nor is this part of the flower, in plants of the same genus, more certain, with respect to number; some species of ranunculus, and hellebore, have five petals; others, an indefinite number; sea-pink has generally five petals; a particular species has only one; some species of fumatory have two; others, four petals. In cassava, and papaw, two exotic plants, a variation, in point of number, is observed in the same species.

These varieties of the petals, with respect to figure and number, afford no despicable marks of distinction in discriminating the species; although it must be acknowledged, that being derived from a principal part of fructification, such characters ought not, in strict propriety, to be employed. Marks of this kind, however, are frequently made use of by Linnæus, though in direct contradiction to his own principles, which establish, that the characters of the species ought to be taken from the parts that are totally unconnected with those of fructification.

In gentian, says Linnæus after the learned Haller, the species cannot be distinguished, without calling in the assistance of the flower, which is subject to considerable variations, being either bell, funnel, or wheel-shaped, and cut into four, five, or eight segments.

The African geraniums are distinguished from the European plants of the same genus, not more remarkably by the union of the stamina, than by the irregularity of the petals.

From luxuriancy of nourishment, the petals are more subject to change, and consequently less to be depended upon,

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upon, than either the stamina, or calyx. Hence their multiplication in double flowers, which, though, in effect, so many monsters in the vegetable kingdom, attract the sole attention of the florist, and furnish such exquisite pleasure by the beautiful variety of their colours. *Vide* PLENUS *Flos*, and MULTIPLICATUS *Flos*.

For a description of the structure, and singularities of the other occasional appendage of the corolla, called by Linnæus, NECTARIUM, see the term itself.

COROLLISTÆ, from *corolla*. By this name Linnæus distinguishes those systematic botanists, who have arranged vegetables from the regularity, figure, number, and other circumstances of the petals, or coloured leaves of the flower.

The best systems of this kind are those of Rivinus, and Tournefort. The former proceeds upon the regularity and number of the petals; the latter, with much more certainty, on their regularity and figure.

Rivinus's object was to find an easy, not a natural method; accordingly his system is the most regular, I mean, deviates the least from the principle with which he sets out, of any that has yet been published.

The authors who have followed his method are,

Koenig, a German, in his second part of the Vegetable Kingdom, published at Basil, in 4to. in 1696.

Welsch, in his Basis Botanica, published at Leipzig, in 1697.

Heucher, Professor of Botany at Wittenberg, in his Hortus Wittembergenfis, published in 1711.

Ruppius, in his Flora Jenensis, published in 1718. This ingenious botanist improved greatly upon Rivinus's Method, particularly in his arrangement of the compound flowers.

Christian Knaut, in his Methodus Plantarum Genuina, published at Halle, in Saxony, in 1716. Knaut's method is that of Rivinus inverted; the number of petals, not their regularity, being the leading principle. This botanist, among other dogmas equally singular, affirmed that all flowers are furnished with petals; and all seeds with a covering or vessel.

Gemeinhart,

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Gemeinhart, a German, in his *Catalogus Plantarum circa Laubam*, published in 1725.

Kramer, a German, in his *Tentamen Botanicum*, published at Dresden in 1728, and reprinted at Vienna, in 1744.

Hebenstreit, Professor of Botany at Leipzig, in a work entitled, *Dissertationes ac Definitiones Plantarum*, published at Leipzig, in 1731.

Ludwig, in his *Definitiones Plantarum*, published at Leipzig, in 1737. The classes in Ludwig's Method are those of Rivinus. The orders or secondary divisions are taken from Linnæus's Sexual System.

Wedel, in his *Tentamen Botanicum*, published in 1747.

M. Boehmer, in his *Flora Lipsiæ indigena*, published at Leipzig, in 1750.

The two last are professed followers of Ludwig's Method.

Lastly, Sigesbeck, in his *Botanophiæ verioris sciagraphia*, published at Petersburg, in 1737.

Among the numerous authors who have followed the ingenious and accurate method of the celebrated Tournefort, are the following :

Sherard, an Englishman, who, in 1689, published at Amsterdam, a rude draught of Tournefort's Method, under the title of *Schola Botanices*. In this work, the plants are arranged according to the order of the Royal Garden at Paris.

Father Plumier, in his *Nova Genera Plantarum Americanarum*, published at Paris, in 4to, in 1705.

Falugi, an Italian, who described, in very elegant Latin verse, all the genera of Tournefort, in a work intitled *Prosopœiæ Botanicæ*, published at Florence, in 1705.

Marchant, Dodart, Nissolle, Jussieu, and Vaillant, in the *Memoirs of the Academy of Sciences at Paris*, from 1700, to 1740.

Johren, a German, in his *Vade Mecum Botanicum*, published in 1710.

Barrelier and Feuillé, in 1714.

Valentine, a German, in his *Tournefortius Contractus*, published at Francfort, in 1715.

Ripa,

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Ripa, an Italian, in a work entitled *Historiæ universalis Plantarum conscribendi propositum*, published at Pavia, in 1718.

Dillenius, in 1719, in his *Flora Giffensis*.

Pontedera, in 1720.

Monti, in a work entitled *Indices Plantarum varii*, printed at Bologna, in 1724.

Micheli, in 1729.

Fabricius, a German, in a work entitled *Primitiæ Floræ Butisbacensis*, published in 1743.

Sabbati, in his *Synopsis Plantarum circa Romain nascentium*, published in 1745.

Alston, Professor of Botany at Edinburgh, in his *Tyrocinium Botanicum*, published at Edinburgh, in 1753. To this work is prefixed a learned and sensible dissertation, containing, amongst other important doctrines, a comparative view of the respective merits of Tournefort and Linnæus.

To these may be added the immortal Boerhaave, who, desirous to have a principal eye in his method, to the consideration of the fruit, combined, in some measure, the different methods of Ray, Hermannus, and Tournefort.

Bernard de Jussieu, a pupil of Tournefort's, is also a follower of his master's method.

COROLLULA, a diminutive from *corolla*, a little wreath, or crown. The name given by Linnæus to the partial petals or florets in a compound flower. These are the *flosculi*, and *semiflosculi* of Tournefort. *Vide* COMPOSITUS *Flos*, and SYNGENESIA.

CORONA, a crown. The name given by some botanists, to the circumference or margin of a radiated compound flower. It corresponds to the *Radius* of Linnæus, and is exemplified in the flat tongue-shaped petals which occupy the margin of the daisy, and sun-flower.

CORONA Seminis. *Vide* CORONULA.

CORONARIÆ, from *corona*, a wreath, chaplet, or garland.

The tenth order of plants in Linnæus's *Fragments of a Natural Method*. Under this name, instead of the more obvious

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Obvious one *liliaceæ*, Linnæus collects a great number of Genera, most of which furnish very beautiful garden flowers, proper for being formed into a garland, or floral crown, (*corona floreæ*, Plaut.)

List of the Genera contained in this Natural Order.

S E C T I O N I.

Liliaceous Plants with a bulbous Root.

Linnæan Genera.		English Names.
<i>Albuca</i> ,	—	Bastard-Star of Bethlehem.
<i>Cyanella</i> .		
<i>Fritillaria</i> ,	—	Fritillary, and Crown Imperial.
<i>Helonias</i> .		
<i>Hyacinthus</i> ,	—	Hyacinth.
<i>Hypoxis</i> .		
<i>Lilium</i> ,	—	Lily.
<i>Melanthium</i> ,	—	Star-Flower.
<i>Ornithogalum</i> ,	—	Star of Bethlehem.
<i>Scilla</i> ,	—	Squill.
<i>Tulipa</i> ,	—	Tulip.

S E C T I O N II.

Liliaceous Plants with fibrous, and tuberous or fleshy Roots.

<i>Agave</i> ,	—	American Aloe.
<i>Aletris</i> ,	—	Bastard Aloe.
<i>Aloe</i> ,	—	Aloe.
<i>Anthericum</i> ,	—	Spider-wort.
<i>Asphodelus</i> ,	—	Asphodel, or King's-spear.
<i>Bromelia</i> ,	—	Ananas, or Pine-apple.
<i>Burmannia</i> .		
<i>Hemerocallis</i> ,	—	Day Lily, or Lily Asphodel.
<i>Polianthes</i> ,	—	Tuberoſe.
<i>Tillandsia</i> .		
<i>Veratrum</i> ,	—	White Hellebore.
<i>Yucca</i> ,	—	Adam's Needle.

Habit

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Habit and Structure of the Plants of this Order.

These plants are herbaceous and perennial, and from one inch to fifteen feet high. A low-growing species of spider-wort is annual.

The **ROOTS** are bulbous in plants of the first section; *Vide BULBUS*; fibrous, and composed of small fleshy knots, which are jointed at the top, in those of the second.

The bulbs in question, either consist of scales laid over each other like tiles, as in lily, hyacinth, star of Bethlehem; or are solid, that is, have no scales, as in tulip.

The **STEM** of the liliaceous bulbous plants, is properly wanting; what supplies its place being nothing else than the base of the leaves, which wrapping, or enfolding each other, form at bottom a roundish fleshy bulb, hitherto distinguished, though perhaps improperly, by the name of root. In the other plants of this order, the stem is simple, that is, has few branches, and is either furnished with leaves, as in star-flower; or rises naked, as in most of the asphodels, and aloes.

Note. A naked stem arising immediately from the root, is termed by Linnæus, *scapus*. *Vide SCAPUS*.

The genus *tillandsia* has a grassy stalk. *Vide CULMUS*.

The **BRANCHES** are alternate, and cylindrical.

The **LEAVES** are simple, alternate, and undivided. Those which are next the root, termed *radical leaves*, generally form at their origin a sheath, which, in a great number, as tulip, spider-wort, white hellebore, asphodel, aloe, and hypoxis, is entire; that is, goes all round; whilst in others, as the lily, crown imperial, American aloe, tuberose, and squill, it is cleft, or divided longitudinally on one side. In lily, and crown imperial, some of the leaves are placed opposite, and some even in whirls round the stem.

The flowers are universally hermaphrodite, except in white hellebore, which has both male and hermaphrodite flowers mixed together on the same root.

The mode of inflorescence, or manner of flowering, in this order, is various. In tulip, the flowers are single, and terminate the stem; in lily, star of Bethlehem, and squill, they form a spike; in crown imperial, an umbel; and in

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Adam's needle, and white hellebore, a panicle, or diffused spike. *Vide* SPICA, UMBELLA, and PANICULA.

The CALYX, or flower-cup, in this order, according to Linnæus, is generally wanting. In strict propriety, however, the single cover that is present in most of these plants, though beautifully coloured, ought to be denominated a calyx; as its divisions, generally six in number, are placed opposite to the stamina. See the article COROLLA.

In pine-apple, tillandsia, and burmannia, which have both covers, the calyx is of one piece deeply divided into three segments.

The PETALS, or, to speak more properly, the coloured leaves of the flower, are in number from one to six. Plants which, like asphodel and tuberosc, have a single petal, have the limb, or upper part, split into six divisions. Burmannia, and pine-apple, have three petals.

The petals in some species of lily, as the martagon, are rolled, or turned back.

The NECTARIUM in this order is various: in the lily it is a longitudinal line, or furrow, which runs through each petal, and reaches from the base to the middle. In crown imperial, it is a small hollow, or pore, formed at the base of each petal; in asphodel, it consists of six very small valves, which approaching, form a globe, and are inserted into the base of the petal; in hyacinth, it is composed of three melliferous pores, situated on the top of the seed-bud. In pine-apple, it is a small scale lying within the substance of each petal, above the base; and in bastard star of Bethlehem, *albuca*, it consists of two sharp pointed bodies, proceeding from the furrows of the seed-bud, and covered by the broader base of the three fertile filaments.

In some species of lily, the nectarium is hairy; in others, it is naked.

The STAMINA, or threads, are six in number, erect, and inserted into the common receptacle, if the flower consists of many petals; into the tube, or divisions of the corolla, if of one. In asphodel, the filaments are bent like a bow, alternately long and short, awl-shaped and attached

attached to the valves of the nectarium. The termination of the filament, in some species of star of Bethlehem, is alternately divided in three; the middle segment supporting the anther. Five species of spider-wort have hairy, or downy filaments. In the genus *albuca*, the stamina are alternately barren, or castrated, that is, want the anthers; and in Adam's needle, the filaments are bent backwards.

The ANTHERS, or tops, are long, commonly divided below, and slightly attached by their sides to the filaments on which they turn like a vane, or the needle of a compass.

The SEED-BUD is single, and placed either within the flower-cup, as in the greatest number; or below it, as in pine-apple, hypoxis, and American aloe.

The STYLE is single, thread-shaped, and generally of the length of the petals. The tulip, and Adam's needle, have no style. In white hellebore, there are three seed-buds, which end in the same number of styles.

The STIGMA, or summit of the style, is generally single, of a conic form, and shaggy or hairy at the extremity. Burmannia, and white hellebore, have three summits.

The SEED-VESSEL is generally a capsule; divided externally into three valves, internally into three cells.

The fruit of the pine-apple is of the nature of a berry.

White hellebore has three capsules, each of which has a single cell, and valves.

The SEEDS are numerous, flat, or round, and generally placed in two rows. In aloe, spider-wort, and asphodel, they are angular. Hyacinth has only two roundish seeds.

With respect to the powers of the plants of this order, it may be affirmed, in general, that such as have little taste, or smell, as the roots of tulip, and star of Bethlehem, are perfectly innocent; whilst those which have a heavy, nauseous smell, as squill, hyacinth, crown-imperial, and spider-wort, are, at least, suspicious, and frequently prove noxious.

The aloe, and American aloe, which by former botanists had been conjoined, on account of their conformity in point of habit, are ranged as distinct genera by Linnæus, principally from this circumstance, that in the former, the seed-

bud is placed within the petal, or flower; in the latter, below it. We may mention also another difference in the growth of the plants, by which they may be distinguished before they flower. In American aloe, the flower-stem is produced from the centre of the radical leaves; and as these are closely folded over each other, it is evident that, until they are fully expanded, the stem is not at liberty to advance. Hence the common opinion, that these plants do not flower till they are a hundred years old, when the flower-stem rises out of the centre of the leaves, produces its flowers, and, with the rest of the plant, quickly dies. The time of its flowering, however, is not limited, but depends upon the growth of the plant, which is particularly affected by heat and cold.

In aloe, the flower-stem is produced on one side of the heart or centre of the plant, so rises annually; the leaves too are always more expanded than those of American aloe.

The mitre-shaped aloe, so termed from the figure of its leaves, is a kind of symbolic plant to the Mahometans, especially in Egypt, and in some measure dedicated to the offices of religion; for whoever returns from a pilgrimage to Mecca, hangs it over his street-door, as a token of his having performed that holy journey. The superstitious Egyptians believe, that this plant hinders evil spirits and apparitions from entering the house; and on this account, whoever walks the streets in Cairo, will find it over the doors both of Christians and Jews. From the same plant, the Egyptians distil a water, which is sold in the apothecaries shops at Cairo, and recommended in coughs, hysterics, and asthmas. An unexperienced French surgeon, says Hasselquist, gave a Coptite, forty years old, afflicted with the jaundice, four tea-cups full of the distilled water of this species of aloe, and cured him in four days. This remedy, unknown to our apothecaries, is not difficult to be obtained; as the plant might easily be raised in the warm southern parts of Europe. The Arabians call it *Sabbara*:

The under leaves of a species of aloe, termed by Linnæus, *aloe disticha*, are of a dark green colour spotted with white,

somewhat

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somewhat resembling the colour of soft soap, whence it is sometimes distinguished by the name of soap-aloe.

The name of pearl-aloe is given to a certain species, the leaves of which are closely studded with white beautiful protuberances.

Of the leaves of the Guinea aloe, mentioned by Mr. Adanson, in his Voyage to Senegal, the Negroes make very good ropes, not apt to rot in the water.

Dr. Sloane mentions two sorts of aloe; one of which is used for fishing-lines, bow-strings, stockings, and hammocks; the other has leaves which, like those of the wild pine, and banana, hold rain-water, and thereby afford a very necessary refreshment to travellers in hot countries, where there is generally a scarcity of wells and water.

The substance, known among druggists and apothecaries, by the name of aloes, is a thick, or inspissated juice, drawn from the plants by expression, or incision. Of this substance, there are three sorts, which differ in purity, and were esteemed by the generality of former botanists to be the produce of the same plant.

The manner of collecting and preparing the juice, is thus explained by J. Bauhin: having cut the herb in pieces, they bruise it, and squeeze out the juice, which they put up into a vessel of a long and round shape, suffering it to stand for the space of twenty-five days: in the mean while, they take care to clear off the useless scum, and throw it away; as also the upper part of the juice, until such time as some difference appears in its colour and consistence. The purer part of this juice, being concreted, is called succotrine-aloes; the remaining part, being of a dark liver-colour, is called hepatick-aloes; and from the dregs, or settlings, is made that sort called caballine, or horse-aloes.

Notwithstanding the contrary opinion of Columna, Bauhin, Ray, and other naturalists, we are now sufficiently certain, that the three kinds of aloes just mentioned, are the juices of three different plants: the succotrine, of the *aloe vera*, of Miller; the hepatic, of the *aloe vulgaris*, of Bauhin, *aloe Dioscoridis et aliorum*, of Sloane, and *aloe bar-*
badensis,

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badenſis, of Miller; the caballine, of the *aloe Guineenſis caballina*, *vulgari ſimilis, ſed tota maculata*, of Commelin.

The fineſt, or pureſt, is the ſuccotrine aloes; ſo called, ſays Pomet, either becauſe the ſubſtance itſelf is a concreted juice, or, which is moſt probable, becauſe the beſt comes from Socotora, or Zocotra, an iſland in the ſtreights of Babelmandel. Succotrine aloes, when broken, is transparent; and when powdered, of a fine yellow golden colour, with a bitter taſte, and a ſmell like that of myrrh.

From the root, and leaves of the Weſt-India, or Barbadoes aloes, is prepared the ſecond ſort, called, from its colour, which is a dark red like that of a liver, hepatic aloes. This ſort, which is coarſer than the former, and ſeldom uſed in medicine except for horſes, is brought us in gourds or calabashes of different ſizes, and weight. It is clear, and not very ſœtid in ſmell.

The third ſort, by much the coarſeſt, black, hard to break, and frequently adulterated, is called caballine aloes, becauſe, like the ſecond ſort, it is ſolely appropriated to the uſe of horſes. This ſort is generally ſold in the ſhops for the true hepatick aloes.

The month of March, ſays Mr. Hughes, in his Natural Hiſtory of Barbadoes, is the propereſt ſeaſon to make the aloes, which is done in the following manner: each Negro has by him, three or four portable tubs, into which the leaves are thrown, with their broken ends downwards. Theſe being full of large longitudinal veins, or veſſels, yield an eaſy paſſage to the juice, which is of a greeniſh yellow colour, to drip out. The juice being boiled for about five hours in a copper, or kettle, the watery particles evaporate; and the remainder comes to a conſiſtency, and thickens, as ſugar doth when ſufficiently boiled. The way to know when it is enough boiled, is to dip a ſtick in the liquor, and obſerve, whether the aloes ſticking to it, when cold breaks ſhort; if it does, then it is boiled to perfection, and fit to be poured into gourds, calabashes, or other veſſels for uſe.

Succotrine aloes, which is the only ſort now preferred in medicine, is ſeldom, or never adminiſtered in potion, by reaſon

reason of its extreme bitterness; but is often given in pills, being, in fact, the basis of the greatest part of the purgative pills now in use. The Francfort, or angelic pill, is entirely composed of it.

In the city of Goa, as Garcias relates, aloes well bruised, and mixed with milk, are prescribed with success to such as are afflicted with ulcers in the kidneys or bladder, and void purulent urine.

The herbs which produce the three medicines just mentioned, are by no means to be confounded with the tree, from which is procured the precious and rare wood called wood of aloes.

The flowers of fragrant *aletris* open only in the evening, when they emit a most agreeable odour, and close again in the morning.

In asphodel-lily with a reddish flower, *hemerocallis fulva*, the summits, or tops of the stamina, are filled with a copper coloured dust, which sheds on being touched; or, if a person smells to the flowers, it will fly off, and spread over the face, which it dyes of a purple colour. This is a trick frequently practised by unlucky, and roguish people, upon the ignorant, and unwary.

The Egyptians put the flowers of tuberose in sweet oil, and by this means give it a most excellent smell, scarce inferior to oil of jessamine.

The roots, leaves, and flowers of the white lily, which is a native of Palestine and Syria, are used in medicine. The root, or bulb, is unctuous, and frequently employed to ripen and digest tumours, and hard swellings. Of the flowers, and sometimes of the root, are prepared an oil, and a distilled water, the former of which is successfully applied in disorders of the skin; the latter in the stone, colic, and pains of child-birth. The distilled water of the leaves is also of great use in distempers of the lungs.

Martagon lily differs from the other species, in having its petals rolled, or turned backwards, in form of a Turkish turban; from which fancied resemblance, the flower is generally known by the name of Turk's-cap. The root,

either boiled, or baked in the ashes, furnishes a principal food to the natives of Siberia, who use, in like manner, instead of bread, the roots of other species of lily, particularly the *Lilium bulbiferum* of Linnæus. The taste, says Gmelin, is somewhat farinaceous, or rather insipid.

The root of white hellebore, *veratrum album*, promotes violent sneezing, and is mixed in ointments, to cure the itch. It is never now given inwardly. Boerhaave very justly observes, that it is a medicine much fitter for horses than men. It is administered as a sternutatory with great success, in apoplexies and lethargic complaints.

The plant is of a poisonous quality, and never fails to prove fatal to such cattle, or other animals, as inadvertently feed on it. In North America, where it is produced in great abundance, the maize, or Indian wheat, is preserved from voracious birds, by means of hellebore, in the following manner:—The roots being boiled, the maize is put into the water, as soon as cool, and having remained in it for a night, is then planted as usual. The grains, thus prepared, are quickly picked up, or plucked out by the crows, and other birds that infest the maize fields, some of which, in consequence of the insidious meal growing delirious and falling, strike such a terror into the rest, that they leave the field, and are not tempted to renew the visit. Care must be taken, however, that no other creatures touch the grains of maize thus steeped, as even a taste produces violent sickness, and, if swallowed in considerable quantity, the consequence is instant death. Scorbutic patients, it is said, have sometimes found great relief by washing the parts affected in a decoction of the roots of white hellebore. The application causes considerable pain, and a plentiful discharge of urine. A comb dipped in the same decoction, and passed through the hair, effectually destroys vermin in the head.

The squills, generally used in medicine, are red, and are the roots of the *scilla maritima*, or sea-onion, of Linnæus. The white sort, which is less common, and known by the name of male squill, is reckoned a variety of the same species. Squills, when sound, are heavy, and full of juice.

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They are used in the shops for making vinegar, and oxymel of squills, and troches for treacle. The heart is reckoned poisonous; for which reason, the druggists split them in two, and throwing away the dry leaves and the heart, expose the remaining part, before it is proper to be used, to the air. A few grains of cinnamon, in powder, say writers on the *Materia Medica*, take off the emetic quality of this root, and render it a powerful diuretic, and an excellent medicine in dropsies.

If the judgment of the most numerous part of mankind who have tasted of the pine-apple, may be relied on, it certainly deserves the appellation it has universally obtained, that of king of fruits; the agreeable variety, and delicate quick poignancy of its juice, being justly esteemed to excel every other. The roots are many, and spread in a circular manner. From the centre rises a strong, hard stalk, surrounded near the earth, and for a considerable way up the stalk, with long green leaves, which are set on alternately, and finely sawed on their edges. The top of the stalk sustains the fruit, which is called the pine, from some resemblance which it has on the outside to the cone of the pine-tree. The fruit is beautifully decorated at top, with a crown of fine green sharp-pointed leaves, which are likewise sawed on their edges. The flowers are funnel-shaped, placed above the fruit, of a blue colour, and consist of three petals. When the flowers are gone, the fruit enlarges and becomes a fleshy, knobby seed-vessel, of the berry kind, full of juice. The seeds, which are lodged in the knobs, or tubercles of the fruit, are very small, and almost kidney-shaped. Some time before the fruit is ripe, two, three, or four suckers grow from the stalk below, yet close to the fruit: these shoots are taken off, and planted; and will in about fourteen months time produce a ripe pine. Those who cannot procure these suckers, sometimes plant the top, or crown. This, though intended by Nature chiefly as an ornament to the fruit, will grow, and in time bear a fruit; not so soon, however, nor so good as that produced by those suckers, which Nature intended to be the means of propagating this fruit. The
three

three best sorts of pines are the Surinam, the sugar-loaf, and queen-pine. The fruit ought to be eaten soon after it is cut, and should not be kept on the stalk in the garden till it be very soft on the outside, as the custom too frequently is.

As pine-apple has naturally a certain degree of acrimony, the Europeans at the Cape of Good Hope remove it, as Kolben informs us, by laying the fruit in slices, in spring-water. It is afterwards put in Rhenish wine, and has sugar scattered upon it, when it tastes deliciously, having thus acquired much of the flavour of strawberries. Of the expressed juice of the Ananas, is prepared an excellent wine, which, says Dr. Fermin, in his Natural History of Surinam, is esteemed almost equal to Malmsey, and intoxicates. Kolben, whom I just mentioned, asserts, that pine-apple, not fully ripe, if eaten by a woman with child, will certainly occasion abortion.

To the same genus with the pine-apple, belongs the Karatas, or penguin, a fruit very common in the West Indies, so named from its outward covering, which is a smooth whitish-yellow husk. The outside of the plant is composed of some scores of hard stiff green leaves, two inches broad, with sharp-hooked prickly edges. These leaves, which grow to about nine feet high, turn scoopingly inward on the upper side, by which means they save and convey the dew and the rain that fall upon them, to the roots. They grow, likewise, almost impenetrably thick near the earth, surrounding and guarding a circular crown, of about a foot diameter. From this grows a cluster of fruits, each four inches long, and one broad, pointed at both ends, and quadrangular in the middle; by which means they are so closely joined, that they cannot easily, until very ripe, be taken asunder. The white outward cover being peeled off, displays a white pulpy substance, containing a great number of very small flatish coal-black seeds. This substance, which is the eatable part, has some small resemblance, in its flavour, of the pine-apple, and is esteemed cooling and wholesome. This fruit, when nearly ripe, being gnawed by rats, or other vermin, emits, from the wounded part, drops of the most transparent gum; which

which manifestly shews, that its juices are much impregnated with volatile oil. A moderate use of this fruit has been very strongly recommended in fevers, and with justice; for by its penetrating, grateful, and active sharpness, it is capable of laying open the orifices of the salival ducts, and thereby enabling the glands of the mouth and throat to discharge the contents, which could not be done before the impediment was removed.

Besides this sort, there is a large and round penguin, of the size of an apple, which is much more palatable than the other, and tasting not unlike a strawberry, is frequently called by that name.

Tillandsia, the caraguata of Father Plumier, the large wild barren pine of the West Indians, is a parasitic plant, and ought, 'perhaps,' in strict propriety, to be denominated an aquatic: for although it is suspended in the air among the branches of lofty trees, to whose boughs it is fastened by its numerous roots; yet it is not indebted to those boughs, like the mistletoe, and other parasitic plants, for nourishment, but merely for support: provident Nature having, in a very extraordinary manner, supplied this with other means to preserve its existence: for the leaves, which much resemble those of the pine-apple, but are larger, surround this plant in a circular manner: each leaf being terminated near the stalk, with a hollow bucket, which contains about half a pint of water. It is by these numerous small reservoirs of water, that the roots, as well as every other part of this plant, are supplied with nourishment, without the help of any earth. The flourishing condition of this plant, as well as the great growth of fig-trees upon barren rocks, shews that water is of greater use to vegetation, than even earth itself.

One contrivance of Nature in this vegetable, says Dr. Sloane, is truly admirable. The seed is crowned with many long, downy threads, not only that it may be carried every where by the wind; but that, by those threads, when driven through the boughs, it may be held fast, and stick to the arms, and prominent parts of the barks of trees. So soon

as it sprouts, or germinates; although it be on the under part of a bough, its leaves and stalk rise perpendicular, or erect; if they assumed any other direction, the cistern or reservoir just mentioned, made of the hollow leaves, could not hold water, which is necessary to the life and nourishment of the plant. In scarcity of water, this reservoir is useful, not to the plant only, but to men, and even to birds, and all sorts of insects, which come thither in troops, and seldom go away without refreshment.

To the same purpose, Dampier, in his Voyage to Campeachy, relates, that the wild pine has leaves that will hold a pint and a half, or quart of rain-water, which refreshes the leaves, and nourishes the roots. When we find these pines, he continues, we stick our knives into the leaves, just above the root; and the water gushing out, we catch it in our hats, as I myself have frequently done, to my great relief.

CORONATRICES, and CORONATI, from *corona*, a crown. The name of the eighth class, in Linnæus's Method founded upon the presence, different species, figure, situation, duration, regularity, and number of divisions of the calyx or flower-cup, consisting of plants, which, like French willow, and tree-primrose, have the seed-bud placed under the flower-cup, which serves it for a crown. This is the *Germen inferum*, and *Calyx superus* of Linnæus.

CORONULA, (diminutive from *corona*); a little crown; a hem, or border, which surrounds the seeds of some flowers in form of a crown. Linnæus defines it to be a sort of little calyx, or flower-cup, *calyculus*, which adhering to the naked seeds of some plants, serves to disperse them. The principal crown of the seed is that fine downy appearance termed by Linnæus, PAPPUS, which see.

In scabious, *knautia*, and some others, the flower-cup becomes the crown of the seed.

CORTEX, (from *corium*, leather, a hide, and *tego*, to cover, *quod quasi corium*, says Isidorus, *lignum tegat*); the rind, or coarse outer bark of plants. The organisation of the outer and inner barks, which differ principally in the fineness

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fineness of their texture, is particularly explained under the article *STRUCTURA Vegetabilis*,

CORYDALES, (from *κorymbos*, *galea*, an helmet, *quod à* *Καφα*, caput, the head). The name of the twenty-fourth order in Linnæus's Fragments of a Natural Method, consisting of plants which have irregular flowers, somewhat resembling a helmet, or hood.

The title of this order seems to have been suggested by a genus in Dillenius of the same name, which Linnæus has joined to his genus *Fumaria*.

List of the Genera contained in this Natural Order.

S E C T I O N I.

Plants with helmet-shaped Flowers, having their Stamina distinct.

Linnæan Genera.		English Names.
<i>Epimedium</i> ,	—	— Barren-wort.
<i>Hypocoum</i> .		
<i>Leontice</i> ,	—	— Lion's-leaf.
<i>Melianthus</i> ,	—	— Honey-flower.
<i>Pinguicula</i> ,	—	— Butter-wort, or Yorkshire fanicle.
<i>Utricularia</i> ,	—	— Water-milfoil.

S E C T I O N II.

*Plants with Helmet-shaped Flowers, having their Stamina united
either by the Filaments, or Tops.*

<i>Fumaria</i> ,	—	— Fumatory.
<i>Impatiens</i> ,	—	— Balsam, or Female Balfamine.
<i>Monnieria</i> ,		

Habit and Structure of the Plants of this Order.

These plants are mostly herbaceous and perennial.

The **ROOTS** are tuberous, or knobby.

The **STEMS** are generally branched.

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The LEAVES are alternate, sometimes simple, but most commonly winged; that is, consist of two or three pair of lobes, or lesser leaves, which are attached to the middle rib. In *monniera*, and some species of balsam, the leaves are opposite.

The foot-stalk of the leaves is narrow, except in barren-wort, where it is large, and has a membranaceous border.

In a species of African honey-flower, STIPULÆ, or scales, are firmly attached to the foot-stalk of the leaves, under which they are placed, so as to make part of its substance; the same subsidiary leaves are likewise united from opposite sides of the stalk; whence they form the appearance of a single scale, and are so denominated by Linnæus.

The middle rib of the leaves, in some species of fumatory, particularly that termed by Linnæus *fumaria claviculata*, is terminated with one branching tendril, which appears to be a fine cylindrical prolongation of the wings, or divisions of the leaves.

In balsam, small glands, or vessels of secretion, are produced from the base of the leaves; roundish vessels of the same kind, distended with air, are placed at the root of water-milfoil; and in butter-wort, the glands are placed upon the surface of the leaves.

The FLOWERS are universally hermaphrodite; that is, contain both male and female organs within the same covers.

They proceed either singly from the wings or angles of the leaves, as in butter-wort, and *monniera*; or are collected in clusters, at the end of the branches, as in fumatory, lion's-leaf, and *hyssopus*.

The CALYX, or flower-cup, consists of two, four, five, or six leaves, which are frequently coloured, and commonly fall off immediately before, or very soon after, the expansion of the petals.

In *monniera*, and butter-wort, the calyx is permanent; that is, accompanies the seed-bud to its maturity.

The COROLLA, or coloured inner cover of the flower, is generally irregular, of one, or many pieces, gaping, and furnished

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furnished with a *nectarium*, or striking appendage, which is very different, in the different genera. In butter-wort, water-milfoil, and balsam, it is shaped like a horn, and produced from the base of the petal. In barren-wort, four cup-shaped *nectaria*, of the length of the petals, are inserted into the common receptacle. In lion's leaf, six equal spreading scales, furnished with foot-stalks, are attached to the base of the petals. In fumatory, each lip of the irregular petal terminates behind in a spur, which, in the lower lip, is generally less prominent. In *monnieria*, a small egg-shaped nectariferous scale, is seated at the base of the seed-bud; and in honey-flower, a very short scale of the same kind is placed within the lower division of the calyx.

In some species of balsam, the horn of the nectarium; in others, two of the five irregular petals, are wanting.

The STAMINA are in number from two to six, and of a proportionate length, except in honey-flower, which has two shorter than the rest.

The FILAMENTS are distinct, except in two genera, fumatory and *monnieria*, which have two sets or strings of filaments united in a cylinder. The former has three *anthers*, or tops, on each set of united filaments; the latter two *anthers* on the upper set, and three on the lower; from whence we may conclude, that the number of stamina in fumatory, is six, of *monnieria*, five; yet Linnæus has placed this last, along with fumatory, in an order, whose characteristic it is to have six stamina.

The genus *monnieria*, which, in America, has constantly five divisions in the corolla, and five stamina, frequently bears flowers in Europe, which have only four divisions in its irregular gaping petal, and four stamina.

The ANTHERS, or tops, in this order, are universally distinct, except in one genus, balsam, where they are formed into a cylinder that is divided at the base.

In barren-wort, and lion's-leaf, the anthers burst, when ripe, from the base to the top, through the whole length.

The SEED-BUD is generally roundish; sometimes, however, angular, as in *monnieria*, and honey-flower.

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THE *STYLE* is commonly single, extremely short, slender, or thread-shaped, and crowned with a simple *stigma*.

Hypocoum has two styles : balsam, none.

THE *SEED-VESSEL* is either a hollow, blown up berry, as in lion's-leaf ; a capsule of one cell, as in butter-wort, and water milfoil ; a longish pod, *siliqua*, as in barren-wort and hypocoum ; or a roundish pod, *silicula*, as in fumatory.

In balsam, the capsule, which in some species is long, in others round, or egg-shaped, bursts open with an elastic spring, at five several valves, which are twisted spirally.

Monnieria has five capsules.

In *Hypocoum*, the pod is jointed, and contains as many cells as there are joints. This striking mark, however, is not constant : the *nectarium* is invariable.

THE *SEEDS* are generally numerous, and round.

In *monnieria*, each seed is inclosed in a dry covering with two valves, called by Linnæus *arillus*, which falls off spontaneously.

Hypocoum has a single seed lodged in each cell or joint of the seed-vessel.

In balsam, the seeds, which are numerous, are affixed to a pillar in the centre of the capsule.

The seeds of *hypocoum* remain a year in the ground without rising.

The juice of these plants, which is generally of a yellow colour, is narcotic and anodyne. The roots are opening. Official fumatory, which is esteemed refreshing, is bitter, and soapy ; its juice deposits a number of nitrous chrystals, of eight sides, which sparkle in the fire. The root of bulbous fumatory is an emmenagogic ; applied externally, it cleanses ulcers, and proud flesh.

The juice of common fumatory is greatly commended for bilious colics ; it destroys warts, and other prominences in the skin ; and mixed with a great quantity of water, is an efficacious lotion in disorders of the eyes.

A species of fumatory is termed *fumaria cava*, from its having a pretty large tuberous root, hollowed in the middle.

The juice of all the species of *hypocoum* is of a yellow colour,

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colour, resembling that of celandine, and is affirmed by some eminent physicians, to be as narcotic as opium. From the nectarium of the blossom, the bees collect great quantities of honey.

The pods of yellow balsamine, or touch-me-not, are taper, twisted spirally like a screw, and upon being lightly touched, or shaken with the wind when ripe, burst open, and eject the seeds with considerable elasticity.

Barren-wort, says an author, whose name I have forgot, is so termed, from the flowers being totally eclipsed, or covered by the leaves; so that, without proper inspection, they appear to be wanting.

From the calyx of the honey-flower, oozes a sweet liquor, which is sometimes used in medicine, and esteemed stomachic, and nourishing. Kolben says, that the Hottentots, and most of the Europeans of the Cape of Good Hope, are exceedingly fond of the sweet juice of the two species of *Melianthus*, which grow naturally there, and never fail of a treat whenever they can find it. *Vide* Kolben, vol. ii. p. 243.

Both honey-flower, however, and barren-wort, are by most authors deemed poisonous. *Vide Phil. Bot.* p. 282, sect. 355.

CORYMBIFERÆ, from *corymbus*, a mode of flowering, and *fero*, to bear. The name of a class in Morison and Ray's Methods, and of Vaillant's Arrangement of the Compound Flowers; consisting of plants, whose flowers are produced in clusters or bunches like those of ivy-berries, and form that particular sort of head, termed by botanists, *corymbus*. *Vide Infra*.

Tansy, feverfew, elecanipane, colt's-foot, groundsel, and marigold, furnish examples.

CORYMBIFERÆ is likewise the name of an order or division of the compound flowers, adopted by Linnæus, after Ray and Vaillant, in the former editions of his Fragments of a Natural Method. This title is in the later editions changed for *Discoideæ*, another name borrowed from Ray's Method, but used in a somewhat different sense.

CORYMBUS, (a *Κεϋς*, *galca*, an helmet, quod a *Καϋς*,

Καεx, *caput*, the head,) properly signifies a cluster of ivy-berries. This is Pliny's definition in the 34th Chapter of the 16th Book of his Natural History. *Corymbus*, inquit, *est hederæ racemus in orbem circumactus*. By Columella it is used to express all such fructifications as grow in a head, or, as Scaliger writes, *quicquid in panicam aut strobilum assurgit*, as artichoke, thistle, &c.—In modern Botany, *Corymbus* is a mode of flowering, in which the lesser or partial flower-stalks are produced along the common stalk, on both sides; and, although of unequal lengths, rise to the same height, so as to form a flat and even surface at top.

The term is exemplified in *spiræa opulifolia*, scurvy-grass, gold of pleasure, stock, and the other cross-shaped flowers, the *Tetradynamia* of Linnæus.

A *corymbus* differs from an umbel, another manner of flowering, in that the numerous partial foot-stalks arise from different parts of the common stalk; whereas in the umbelliferous flowers, they all proceed from a common centre. *Vide UMBELLA*.

A *corymbus* may be supposed to be formed from a spike, a third mode of inflorescence, as Linnæus terms it, by raising the flowers on partial foot-stalks, which rise to a proportionable height. The flowers in a spike are seated on the common stalk, without any proper or partial foot-stalk. *Vide SPICA*.

This manner of flowering as well as the others, frequently affords certain marks in distinguishing the species. Thus in *spiræa*, the species are scarce to be distinguished, but by the mode of flowering, which in some, is a *corymbus*; in others, an umbel; and in others, a *racemus*, or cluster like that of grapes. *Vide RACEMUS*.

The partial foot-stalks in a *corymbus*, are sometimes simple, that is, have no branches, as in some species of star of Bethlehem; sometimes branch out into several irregular ramifications, yet so as to form an even surface at top. In the former case, the *corymbus* is said to be simple; in the latter, compound.

The *corymbus* is a mean betwixt the cluster, *racemus*,
and

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and the umbel; like them, its flowers are furnished with proper foot-stalks, which rise gradually from bottom to top, as those of the *racemus*, and are produced to the same height, as those of the umbel.

COTYLEDONES, (from *Κοτολη*, *cavitas*, a hollow); a term of placentation transferred from the animal to the vegetable kingdom. The perishable, porous side-lobes of the seed, which involve, and, for some time, furnish nourishment to the embryo-plant.

The lobes in question, generally two in number, are very conspicuous in the bean, and most of the leguminous tribe, upon stripping off the husk, or outer cover of the seed; particularly if they have previously been laid in earth or water. Their substance is mealy, mucilaginous, and easily ferments. They result from the expansion of an infinite number of branching vessels.

The lobes are externally convex, internally flat, unless where they are united, and infold the principle of life, *corculum*, which communicates with them by means of two large trunks of vessels, that supply it with nourishment, and correspond to the navel-string in animals; as the lobes themselves seem to answer the purpose of the placenta in women, and cotyledones in brutes.

We said, in the definition, that the lobes are the perishable part of the seed. To explain this, we must previously observe the changes which are effected upon the embryo-plant, in the first stages of vegetation.

After lying some time in water, or earth, the lobes of the seed, penetrated by the watery particles, which are charged with nutritive juices, put in motion by heat, swell and thicken; the air contained within their substance, dilating, bursts open the outer cover, or husk, which unites them, and discovers the radicle, and embryo-plant. In this first stage, the seed is properly said to sprout, or germinate. Soon after, the lobes expanding, rise out of the earth, in the form of leaves; very different, however, from those which the plant is afterwards to produce. In this stage, the seed is properly said to rise.

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These leaves, called, for distinction, feminal, or seed-leaves; (that is, the first leaves produced by the seeds) are commonly two in number: some seeds, however, have only one feminal leaf; in which case, the plants by botanists are termed Monocotyledonous, a term of the same import; as those which rise with two feminal leaves, are stiled Dicotyledonous. Cæsalpinus, and Jungius, termed both these kinds of seeds, univalvular, and bivalvular; that is, having one, or two seed-covers. The former was the first who discovered the number of lobes in the embryo of seeds.

To proceed with our infant-plant. Under this new form of leaves, the lobes elaborate, and rectify the sap, which is destined to nourish the tender vegetable. The young root too, which naturally tends downwards, has by this time made some efforts to penetrate into the bosom of the earth, where meeting with strong exhilarating juices, it transmits them to the lobes, through which they pass highly refined, to the future plant. The stem begins to appear; but although enlarged in volume, its parts are not developed, but continue as they were in the seed. The lobes, still united to the plant by the two trunks of vessels, accompany it for some time after its eruption from the earth, till, having acquired sufficient strength and growth, the feminal leaves become useless, wrinkle, wither, and die away. *Vide GERMINATIO.*

Of plants which have only one feminal leaf, we must carefully distinguish those in which the lobe forms a sort of sheath surrounding the whole body of the plant, as in the palms, grasses, and liliaceous vegetables, from those in which the lobe is only extended in length, as in dodder.

Pine and fir trees, says Linnæus, have ten; cypress, five; flax, four lobes; in fact, however, these plants have only two lobes, each of which is differently divided almost to the base: the lobes only being perfectly distinct.

The presence of the lobes, or feminal leaves, sufficiently evinces the previous existence of the seed; and confutes the ridiculous opinion of equivocal generation, long since exploded.

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The lobes being in the vegetable æconomy, what the placenta is in the animal, their disposition at the time when the seed begins to grow, is termed very properly by Linnæus, placentation.

In the mushrooms, ferns, and other imperfect plants, the feminal leaves are not sufficiently ascertained. The seeds of the mosses want only the proper covering and lobes. *Vide* ACOTYLEDONES.

The number of lobes, or seed-leaves, furnishes a primary distinction in Ray's Method.

CRETA, chalk; a species of earth.

CRUCIFORMIS *Flos*, (from *crux*, a cross, and *forma*, a shape or figure); a cross-shaped flower; a flower consisting of four equal petals, which spread at the top, in form of a cross. Stock gilly-flower, honesty, and candy-tuft, furnish examples.

CRUCIFORMES. The name of the fifth class in Tournefort, and seventeenth in Pontedera's Method, consisting of plants with cross-shaped flowers. These are the *Siliquosæ* of Morison, Hermannus, Royen, Boerhaave, and Ray; the *Tetrapetali regulares* of Rivinus, and Christopher Knaut; the *Tetrapetali uniformes* of Christian Knaut; and the *Tetradynamia* of the Sexual Method. *Vide* SILIQUOSÆ, &c.

CRYPTOGAMIA, from *κρυπτω*, to hide, and *γαμος*, a marriage; a clandestine marriage. The name of the twenty-fourth class in Linnæus's Sexual Method, consisting of plants, in which the parts of fructification, the criterion of the sexes, are, either from their minuteness, or their particular situation, entirely concealed, or imperfectly visible.

The great obscurity that still prevails in this very considerable part of the vegetable kingdom, notwithstanding the ingenious researches of Ray, Micheli, Dillenius, Gmelin, Haller, Battarra, Schæffer, Stackhouse, and other eminent names in Botany, the Sexual Method of Arrangement is little qualified to dispel. Indeed it would be difficult to conceive a systematic method, in which the numerous plants of the class *Cryptogamia*, could be arranged with facility; but in Linnæus's System, the difficulty must be tenfold, as,

from the absence, or unascertained presence of the very organs which lay the foundation of the primary divisions, the character of the class and order is necessarily, in many instances, merely negative; and the subordinate divisions, of course, are strangely huddled together, without essential and certain marks of distinction.

The class Cryptogamia, which corresponds to the Imperfect Plants of Ray, and to the 16th and 17th classes of Tournefort's Method, containing herbs not bearing flowers, with and without seeds, is divided into four orders. These are, *Filices*, Ferns; *Musci*, Mosses; *Algæ*, Sea-weed, or Wrack; and *Fungi*, Mushrooms. *Vide* FILICES, ALGÆ, &c.

For a more particular account of the progressive discoveries of Naturalists in this extensive department of Botanical knowledge, the reader is referred to the author's INSTITUTES OF BOTANY, Part I. p. 67, and seq.

Considered as a natural class, or rather as an assemblage of natural orders, the plants in question are generally of a suspicious nature.

CUBITUS, a term of measure. *Vide* MENSURA.

CUCURBITACEÆ, from *cucurbita*, a gourd; the name of the thirty-fourth order in Linnæus's Fragments of a Natural Method, consisting of plants which resemble the gourd in external figure, habit, virtues, and sensible qualities.

List of the Genera contained in this Natural Order.

SECTION I.

Cucurbitaceous Plants with Hermaphrodite Flowers.

Linnæan Genera.	English Names.
<i>Gronovia.</i>	
<i>Melothria,</i>	— — Small creeping Cucumber.
<i>Passiflora,</i>	— — Passion-Flower.

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SECTION II.

Cucurbitaceous Plants with male and female Flowers produced either on the same or distinct Roots.

Linnæan Genera.

English Names.

Anguria Jacquin.

Bryonia, — — — Bryony.

Cucumis, — — — Cucumber, Melon.

Cucurbita, — — — Gourd, Pumpkin.

Elaterium Jacquin.

Fevillea.

Momordica, — — — Male Balsam-apple.

Sicyos, — — — Single seeded Cucumber.

Trichosanthes, — — — Serpent-Cucumber.

Habit and Structure of the Plants of this Order

The plants of this order, which generally climb, and have long diffused branches, are mostly herbaceous and perennial. Wild cucumber, the *Elaterium* of Boerhaave, a species of *Momordica* of Linnæus, is the only plant in this order, which rises erect, without climbing, or supporting itself on the plants in its neighbourhood. Some species of passion-flower are of the shrub and tree kind, and retain their leaves during the winter.

The ROOTS, in the perennial plants of this order, are shaped like those of turnip; in the annuals, they are branched and fibrous.

The STEMS are cylindric and succulent. The young branches have generally five angles. In some species of passion-flower, they are square.

The LEAVES are alternate, angular, and sometimes hand-shaped. They are attached to the branches by a foot-stalk, which is pretty long, and cylindrical, without any furrow. In a species of passion-flower, hence denominated *passiflora vespertilio*, the leaves are shaped like the wings of a bat, and supported on a foot-stalk half an inch long.

From the wing or angle of each of the upper leaves, proceeds a tendril, which is either simple or branched, and twists itself spirally round the different bodies in its neighbourhood, for the purpose of supporting and training the branches.

The lower leaves have no tendril. Wild-cucumber, in which the tendrils seem wanting, has a small *stipula*, or scale, in the form of a triangular tongue, at the origin of each of the male flowers.

Besides tendrils, water-melon, and some species of bryony, have a *stipula*, or scale, of an oval shape, which issues from the wing or angle of each leaf. In male-balsam apple, a scale of the same kind accompanies each flower. Passion-flower has two pretty large *stipulæ*, or scales, which are placed on both sides of the foot-stalk of the leaf.

In the gourd, glands, or secretory vessels, are placed on the base of the leaf: in the passion-flower, they are seated on the foot-stalks.

The FLOWERS, in plants of the first section, are hermaphrodite; male and female, in those of the second. In this last, the male flowers are generally separated from the female upon the same root, and that either in the same wing, or angle of the leaves, as in *Sicyos* and serpent-cucumber; or in different angles, as in gourd, and some species of bryony.

In *fevillea*, and some species of bryony, the male flowers are produced on distinct roots from the female.

Small creeping cucumber, *melothria*, has hermaphrodite flowers; in every other respect it resembles the cucumber, to which most botanists have joined it.

The flowers proceed from the wings of the leaves, either singly, as in pumpkin, water-melon, male balsam-apple, and passion-flower; two and two, as in some cucumbers; in a *spike*, as in *fevillea*, and serpent-cucumber; or in a *corymbus*, as in bryony, and the male flowers of gourd. In single-seeded cucumber, the male flowers form a spike, the female a corymbus.

The FLOWER-CUP, in the female flowers, is placed
upon

upon the seed-bud, and generally consists of one bell-shaped leaf, that is deeply divided into five equal segments; and, unlike the other plants which have the calyx seated upon the fruit, falls off with the petals and the other parts of the flower. In the genus *gronovia*, the calyx is permanent; that is, accompanies the seed-bud to its maturity. In the passion-flower, it is seated below the seed-bud. *Elaterium*, a genus of M. Jacquin, has no calyx.

The COROLLA consists of one petal, with five equal divisions, which adhere to the tube of the calyx as if glued to it. *Anguria*, *Gronovia*, and passion-flower, have five petals. These, in the latter, are lancet-shaped, flat, of the size, figure, and colour of the calyx. A species of passion-flower, termed by Linnæus *passiflora suberosa*, wants the petals.

The NECTARIUM, in passion-flower, is very singular, consisting of a number of beautiful fibres, or rays, which are placed horizontally within the petals, in three series or rows. These Linnæus calls, very improperly, a triple crown: a triple helmet would have been equally expressive of the appearance; but this is not the only impropriety in Linnæus's description of this beautiful flower.

The gourd has a hollow, triangular gland, or vessel of secretion, seated in the middle of the flower.

In *fevillea*, the nectarium consists of five crooked threads, or strings, which in the male-flowers are placed in the middle, alternate with the stamina.

The STAMINA are, in number, from one to five, short, and generally inserted into the calyx.

In passion-flower, they are attached to a pillar-shaped receptacle, which stands in the middle of the flower, and is crowned with the seed-bud. This receptacle, Linnæus, who was resolved, at all events, to obtrude this genus into his class *Gynandria*, has dignified with the name of a pillar-shaped style: by which means he has fallen into the absurdity of asserting, that the style in the passion-flower elevates the seed-bud, contrary to what is observed in every other flower yet known. The uselessness of this pillar-shaped style

style farther appears from this circumstance, that three styles properly so called, arise from the *germen*, as in other flowers.

The filaments, in this order, are distinct; the *ANTHERS*, or tops, in most plants of the second section, are united in a cylinder. Bryony has five anthers to three filaments.

In the female-flowers are sometimes observed three, or four filaments, which have the appearance of stamina without tops. These, in bryony, and male balsam-apple, are attached to the top of the tube of the petal; in pumpkin, gourd, and water melon, they proceed from its base.

The anthers in passion-flower, are slightly attached to the filaments, on which they turn like a vane, or the needle of a compass.

The *SEED-BUD* is single, and placed below the receptacle of the flower. In passion-flower, it is seated upon a long pillar-shaped receptacle, in the middle of the flower. The seed-bud, in the genus *elaterium*, is covered with prickles.

The *STYLE* is generally single, cylindrical, of the length of the calyx, and crowned with a triple *stigma*. Passion flower has three styles; *fevillea*, five. The male-flowers of serpent-cucumber, have three very small styles, adhering to the tube of the calyx.

The *SEED-VESSEL* is generally pulpy, of the apple, or berry kind, and consists of one, two, or three cells. In *elaterium*, and *gronovia*, it is a capsule, which in the former is prickly and succulent.

The fruit of single-seeded cucumber, is at first a thorny berry, which dries, and hardens as it ripens, so as to become a very dry capsule, before the seeds have attained maturity. The partitions which separate the cells are composed of fibres surrounded with a watery pulp, which, when dried, discovers the fibres, under the form of a thick-set web or net.

The *SEEDS* are numerous, generally flat, or compressed, and sometimes, as in passion-flower and cucumber, covered with that kind of proper coat called by *Linnaeus*, *arillus*.
Vide ARILLUS.

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In male balsam-apple, and wild cucumber, the seeds burst, or are spirted from their cells with an elastic spring.

The fruit of these plants is generally purgative and refreshing. That of some of them proves a very violent emetic, when used too freely.

Male balsam-apple, is famous in Syria for curing wounds. The natives cut open the unripe fruit, and infuse it in sweet oil, which they expose to the sun for some days, until it is become red; and then present it for use. Dropped on cotton, and applied to a fresh wound, the Syrians reckon this oil the best vulnerary next to balsam of Mecca, having found by experience, that it often cures large wounds within three days. The leaves and stems of this plant are used for arbours, or bowers.

The Egyptian balsam-apple, called by the Arabians liff, or luff, is cultivated in gardens, in the eastern countries, and climbs upon palm trees; covering, and elegantly adorning their stems.

The elaterium of the shops, is the fruit, or rather the inspissated fæcula of the juice of the fruit, of the wild, or ass's cucumber, a species of balsam-apple. It is usually sent us from Spain, and the southern parts of France, where the plant is common, in small flat whitish lumps, or cakes, that are dry, and break easily between the fingers. It is of an acrid, nauseous, bitter taste, and strong offensive smell, when newly made: but these, as well as its other qualities, it loses, after being kept for some time. Elaterium is a very violent purge and vomit, and is now very seldom used. The plant is commonly called spirting-cucumber, from its casting out its seeds, together with the viscid juice in which they are lodged, with a violent force, if touched, when ripe; from which circumstance it has sometimes obtained the appellation of *noli me tangere*, or, touch me not.

The root of white bryony is said to be so violent in its effects, when taken fresh, that the peasants call it the mad turnip: being dried, it enters as an ingredient into some medicinal compositions, particularly bryony-water, in which
it

it is reckoned to assist as a powerful uterine cleanser. Some believe bryony to be an excellent remedy against the bites of serpents, and other venomous creatures. Its fæcula, when dried, is like starch; but as this is found a medicine of little use, there is hardly any of it now made.

In the eastern countries, and both the Indies, bottle-gourd, the *cucurbita lagenaria*, of Linnæus, is very commonly cultivated, and sold in the markets for the table, and is the principal part of the food of the common people in the warm months, particularly from June to October. The Arabians call this kind of gourd, charrah. They boil it, and season it with vinegar; they likewise fill the shell with rice and meat, and thus make a kind of pudding, like what we sometimes, in England, prepare of the shell of pumpkin, or pumpkin.

The leaves of the bottle-gourd are large, almost circular, covered with fine soft hairy down, and smell strongly of musk. The flowers are so tender, that they close as soon as the sun shines upon them. The outside tegument or rind of the fruit, as it ripens, grows hard; and when the seeds and pulp are taken out, will hold water, for which purpose it is sometimes used. Some gourds are six feet long, and one and a half round, and when cleared of their pulp, will contain twenty-two gallons: such, however, are very uncommon.

The different kinds of pumpkin, the *cucurbita pepo*, of Linnæus, are generally distinguished by the names of the white, the blue, the marbled, and the garden pumpkin. These make a great part of the food of the poorer sort in summer, as well in Asia, and Africa, as in America. The stalks and leaves are hairy, the flowers yellow, the fruit is generally, when young, of a mixture between a deep blue and a pale white. It is boiled and eaten with butcher's meat; and by the poorer sort is much used in soups.

Squash, *cucurbita melopepo*; and warted gourd, when boiled, are by some people esteemed very delicate eating. The squash is generally plucked by the Americans, when it

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is about the size of a walnut, and immediately after the falling of the flower.

Water-melons, or citruls, the *Anguria* of Tournefort, the *cucurbita citrullus* of Linnæus, are distinguished by the colour of their pulp, into the white and red, and derive their name from the great quantity of water, or liquid, which they contain. These fruits, by their cooling and diuretic quality, are so beneficial in hot climates, if used in moderation, that the poor people in Persia, and the Levant, live almost solely, during the hot months, upon the musk and water-melon, cucumbers, and milk. The water-melon, says Hasselquist, serves the Egyptians for meat, drink, and physic: when it is very ripe, and almost putrid, they hollow part of it, gather the juice there collected, and mixing it with rose water, and a little sugar, administer it in burning fevers, with such success, that the common people use no other medicine in those distempers. It is not, however, from the common water-melon, that this medicine is procured. The fruit in question, is softer, more juicy, and more rarely to be found than the common sort, of which this is a variety. It is termed by the Arabs, et-naovi, which signifies water.

Water-melons should be eaten with great circumspection; for if taken in the heat of the day, when the body is very warm, they seldom fail to occasion colics, fluxes, and disorders of the stomach.

The common cucumber, in the eastern countries, is boiled and eaten with vinegar. The richer sort fill it with flesh and spices, and bake it into a pudding, which is said to be extremely palatable.

The Egyptian melon, or queen of cucumbers, the *Cucumis Chate* of Linnæus, the *Abdellavi* of Alpinus, grows in the fertile earth round Cairo after the inundation of the Nile, and no where else in Egypt. The fruit is sometimes sweet, cool, and a little watery; the pulp almost of the same substance as the melon. The grandees in Egypt, and the Europeans who reside there, esteem this the pleasiest, as well as safest fruit, which the country affords.

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The musk-melon is distinguished, like the water-melon, by the colour of its pulp, into the white and red sorts; and derives its name from the fragrancy of the smell.

Coloquintida, or bitter-apple, the *Colocynthis* of Tournefort, the *Cucumis Colocynthis* of Linnæus, is brought to us from Aleppo, and the island of Crete. The leaves are large, placed alternate, almost round, and stand upon foot-stalks four inches long. The flowers are white, succeeded by a fruit, which is yellow when ripe. The shelly or husky outside incloses a white bitter pulp, interspersed with white flattish seeds. If a hole is made in one of these ripe gourds, (for the fruit is of that kind,) and a glass of rum poured in, and suffered to remain for twenty-four hours, and then drunk, it proves a successful purge; but is so bitter, and leaves such a nausea behind, that it is seldom used. It is besides, the roughest purge we know, and therefore ought not to be used without great precaution; taken in a large dose, it not only often brings away pure blood, but likewise produces colics, convulsions, ulcers in the bowels, and fatal super-purgations. The Indians separate or pull off the outer rind, and dry the fleshy part of the fruit, which is what we call the Coloquintida of the shops.

CULMIFERÆ *Plantæ*, from *culmus*, a straw, or haulm; plants so called which have a smooth jointed stalk, usually hollow, and wrapped about at each joint with single, narrow, sharp-pointed leaves; and the seeds contained in chaffy husks. Such are oat, wheat, barley, rye, and the other plants of the natural family of the grasses. *Vide GRAMINA.*

CULMIFERÆ, the name of the eleventh class in Morison's Method, consisting of plants which agree in the general characters above enumerated.

CULMINIÆ, from *culmen*, the top, or summit; the name of an order in the former editions of Linnæus's Fragments of a Natural Method, consisting of a number of plants, mostly of the mallow-tribe, now removed to the natural order COLUMNIFERÆ, which see.

CULMUS,

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CULMUS, (a *Καλαμν*, *slipula*, stubble, non a *Καλαμος*, *arundo*, a reed); a straw, or haulm; defined by Linnæus to be the proper trunk of the grasses, which elevates the leaves, flower, and fruit.

This sort of trunk is tubular or hollow, and has frequently knots or joints distributed at proper distances, through its whole length. The leaves are long, sleek, and placed, either near the root in great numbers, or proceed singly from the different joints of the stalk, which they embrace at the base, like a sheath, or glove.

The haulm is commonly garnished with leaves; sometimes, however, it is naked, that is, devoid of leaves, as in a few species of cypress-grass. Most grasses have a round cylindrical stalk; in some species of *schænus*, *scirpus*, cypress-grass, and others, it is triangular.

The stalk is sometimes entire, that is, has no branches; sometimes branched, as in *schænus aculeatus* & *capensis*, and not seldom consists of a number of scales, which lie over one another like tiles, (*imbricatus*.)

Lastly, in a few grasses, the stalk is not interrupted with joints, as in the greater part. The space contained betwixt every two knots or joints, is termed by botanists *internodium*, and *articulus culmi*. *Vide* ARTICULUS.

This species of trunk often affords certain marks of distinction in discriminating the species. Thus in the genus *Eriocaulon*, the species are scarce to be distinguished but by the angles of the *culmus*, or stalk. These in some species are in number five, in others six, and in others ten.

CYMA, (from *Κυμα*, *idem quod* *Κυρμα*, *fœtus*,—the uppermost tender shoots of herbs, particularly of coleworts); a species of receptacle, according to Linnæus; or more properly, a mode of flowering, in which, as in the umbel, a number of slender foot-stalks proceed from a common centre, and rise to the same height: but, unlike the umbel, the secondary or partial foot-stalks are dispersed without any regular order. *Vide* UMBELLA.

The term, which is of great antiquity, having been used, though not in the sense now affixed to it, both by Columella

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mella and Pliny, is exemplified in elder, gelder rose, bloody rod, and adder's tongue.

CYMOSUS *Flos*, from *cyma* : an aggregate flower, which has the general characters just enumerated. *Vide* **CYMA**, and **AGGREGATUS** *Flos*.

CYMOSÆ. The name of an order in the former editions of Linnæus's Fragments of a Natural Method, consisting of honey-suckle, morinda, loranthus, and a few other genera, most of which are, in the later editions, removed to the forty-eighth order, intitled **AGGREGATÆ**.

CYNAROCEPHALI, (a *cinara* or *cynara*, an artichoke, derived from the Greek *Κινάρα*, *carduus*, a thistle, in which sense it is used both by Dioscorides and Athenæus, and *Κεφαλή*, the head), plants whose flowers form a head like those of artichoke. The name of a class, or division, in Vaillant's Arrangement of the Compound Flowers, corresponding to the *Capitatæ*, or flowers forming a head, of Ray, and other botanists; and to part of the *Flosculosi* of Tournefort. It is exemplified in thistle, globe-thistle, burdock, saw-wort, and blue-bottle.

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DECAGYNIA, (from *δεκα*, ten, and *γυνή*, a woman.) The name of an order, or secondary division, in the class Decandria, of the sexual method, consisting of plants whose flowers are furnished with ten stamina, and the same number of styles. *Neurada* and American nightshade furnish examples.

DECANDRIA, (from *δεκα*, ten, and *άνη*, a man.) The name of the tenth class in Linnæus's Sexual System, consisting of plants whose flowers, as the name imports, are furnished with ten stamina or male organs. This class, as well as the other classes in Linnæus's Method that are compounded with a numeral, has another character, which is not expressed in the title. I mean that the flowers are all hermaphrodite, that is, have both stamina and pistil, which, according

according to our author, are the male and female organs of generation, within the same covers. In this respect, the classes in question differ from the *Monœcia*, and *Diœcia*, of the same author, in which the male and female organs are separated; being placed, in the former, upon different parts of the same plant; in the latter, upon distinct plants. This observation merits particular attention, because the circumstance, or character which is the subject of it, is indispensably necessary; and a plant having ten or any number of stamina, is not on that account to be referred to its respective numeral class, unless both male and female organs are found contained within the covers of the flower.

To take an example from the class which we are now considering: the flowers of the curious exotic, papaw, or popo-tree, have ten stamina; and yet the plant cannot be arranged under the class *Decandria*, because the male and female parts are not only placed within different covers, but likewise produced upon distinct plants: the popo seed ripened by the female flowers producing both male and female trees.

Besides the sexes of the flowers, we are likewise to attend, that the stamina be of an equal length and distinct; that is, neither joined at the bottom, nor top; circumstances which would remove the plants in which they are found, to classes whose essential character is no ways connected with the number of the male and female organs.

The orders or secondary divisions in this numerous class, are five, and take their name from the number of the styles, or female organs. *Fraxinella*, *lignum vitæ*, dwarf rose-bay, and strawberry-tree, have one style; soap-wort, and carnation, have two; cucubalus, viscous campion, and sand-wort, three; hog-plum, navel-wort, and house-leek, five; *Neurada*, and American night-shade, ten.

DECANDRIA is likewise the name of an order or secondary division in the classes *Monadelphica*, *Diadelphica*, *Gynandria*, and *Diœcia*, in all which, the classic character being unconnected with the number of stamina, that circumstance, properly enough, serves as a foundation for the secondary or subordinate division.

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DECANTHERÆ, from *δεκα*, ten, and *antheræ*, the tops of the filaments. The name of an order or secondary division in Ludwig's improved Method, consisting of plants, which to the classic character, whatever it is, add the circumstance of having ten stamina, or male organs.

DECIDUUS, (from *dēcido*, to fall off, or down, to die); —Deciduous; a term expressive of the second stage of duration in plants, but, like *caducus*, susceptible of different senses, according to the particular part of the plant to which it is applied. A leaf is said to be deciduous which drops in autumn.—Petals are deciduous which fall off with the *stamina* and *pistillum*; and this epithet is applied to such flower-cups as fall after the expansion and before the dropping of the flower. This last is exemplified in berberry, and the flowers of the class *Tetradynamia*. Vide **CADUCUS** and **PERSISTENS**.

DECOMPOSITÆ, the name of the tenth class in Sauvage's *Methodus Foliorum*, consisting of plants, whose leaves are twice compounded; that is, have a common foot-stalk supporting a number of lesser leaves, each of which is compounded. Vide **FOLIUM Decompositum**.

The term is exemplified in fumatory, barren-wort, bignonia, germander, feverfew, and some umbelliferous plants.

DECOMPOSITI Flores;—some compound flowers so termed by Linnæus, which contain within the same common calyx, a number of lesser or partial flower-cups, that are each of them common to many florets. The term is exemplified in elephant's foot, and globe flower. A few other compound flowers, as globe-thistle, *gundelia*, and *floebe*, have partial flower-cups; but each of these contains only a single floret. Linnæus reduces all the compound flowers which have partial flower-cups, under the order *Polygamia Segregata* of the class Syngenesia.

DECUMBENS Flos, from *decumbo*, to lie down; a drooping flower, in which the stamina and pointal are inclined towards the lower side; exemplified in wild-sena, and the pea-bloom, or butter-fly-shaped flowers.

DEFOLIATIO, from *de*, and *folium*, a leaf; the fall of the

the leaves. A term opposed to *Frondefcentia*, the annual renovation of the leaves, produced by the unfolding of the buds in spring.

Most plants in cold and temperate climates, shed their leaves every year. This happens in autumn, and is generally announced by the flowering of the common meadow saffron. The term is only applied to trees and shrubs; for herbs perish down to the root every year, losing stem, leaves, and all.

All plants do not drop their leaves at the same time. Among large trees, the ash and walnut, although latest in unfolding, are soonest divested of them: the latter seldom carries its leaves above five months.

On the oak and horn-beam, the leaves die, and wither, as soon as the colds commence; but remain attached to the branches till they are pushed off by the new ones, which unfold themselves the following spring. These trees are doubtless a kind of evergreens; the leaves are probably destroyed only by cold; and, perhaps, would continue longer upon the plant, but for the force of the spring-sap, joined to the moisture.

In mild and dry seasons, the lilac, privet, yellow jessamine of the woods, and maple of Crete, preserve their leaves green until spring, and do not drop them till the new leaves are beginning to appear. The fig-tree, and many other trees that grow between the tropics, are of this particular class of ever-greens. The trees in Egypt, says Dr. Hasselquist, cast their leaves in the latter end of December, and beginning of January, having young leaves ready before all the old ones are fallen off; and to forward this operation of Nature, few of the trees have buds; the sycamore and willow, indeed, have some, but with few and quite loose *stipulae*, or scales. Nature did not imagine buds so necessary in the southern, as in the northern countries; this occasions a great difference between them.

Lastly, some trees and shrubs preserve their leaves constantly through the whole year: and are not in the least influenced by the clemency or inclemency of seasons. Such

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are the fir, juniper, yew, cedar, cypress, and many other trees, hence denominated ever-greens. These preserve their old leaves a long time after the formation of the new, and do not drop them at any determinate time. In general, the leaves of ever-greens are harder, and less succulent than those which are renewed annually. The trees are generally natives of warm climates, as the alaternuses of France and Italy, the ever-green oak of Portugal and Suabia.

Some herbaceous perennials, as the house-leeks and navel-worts, enjoy the same privilege with the ever-green trees, and resist the severities of winter: some even can dispense with the earth for some time; being replete with juices, which the leaves imbibe from the humidity of the atmosphere, and which, in such plants, are, of themselves, sufficient for effecting the purposes of vegetation. It is for this reason that, unless in excessive hot weather, gardeners are seldom wont to water fat succulent plants, as the aloe, which rot when they are moistened, if the sun does not quickly dry them up.

The leaves of all the ever-green shrubs and trees, have a thin compact skin or cover, over their surface; as is easily discovered by macerating them in water, in order to separate the parenchyma, or pulp, from the vessels of the leaves; which cannot be effected in any of these ever-greens, till a thin parchment-like cover is taken off. These trees and shrubs are found by experiment to perspire but little, when compared with others which shed their leaves; and it is perhaps, principally owing to this close covering, as also to the small proportion of moisture contained in their vessels, that they retain their verdure, and continue through the winter on the trees. The nutritive juices of these plants always abound more or less with an oily quality, which secures them from being injured by severe frosts; so that many of these ever-green trees are adapted to grow in the coldest parts of the habitable world.

With respect to deciduous trees, the falling off of the leaves seems principally to depend on the temperature of the atmosphere, which likewise serves to hasten or retard the
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the appearance in question. An ardent sun contributes to hasten the dropping of the leaves. Hence in hot and dry summers, the leaves of the lime tree and horse-chestnut turn yellow, about the first of September; whilst in other years, the yellowness does not appear till the beginning of October. Nothing, however, contributes more to hasten the fall of the leaves, than immoderate cold or moist weather in autumn; moderate droughts on the other hand serve to retard it. As a proof of this position, M. Adanson relates, that in the year 1759, the leaves of the elm-tree, which generally fall off about the twenty-fifth of November, continued in verdure and vigour at Paris, where the autumn was remarkably dry, till the tenth of the following month.

The following table, respecting the mean times in which different trees shed their leaves, is founded upon observations.

Gooseberry-tree, and Bladder-Sena,	} generally quit their leaves about	October 1st.
Walnut and Ash,		—— 15th.
Almond-tree, Horse-chestnut, and lime-tree,		—— 20th.
Maple, Hazel-nut, Black-poplar, and Aspin-tree		—— 25th.
Birch, Plane-tree, Mountain-osier, False-acacia, Pear and Apple-tree,		November 1st.
Vine, Mulberry, Fig, Sumac, and Angelica-tree,		—— 10th.
Elm-tree, and Willow,		—— 15th.
Apricot, and Elder-trees,		—— 20th.

It deserves to be remarked, that an ever-green tree grafted upon a deciduous, determines the latter to retain its leaves. This observation is confirmed by repeated experiments; particularly by grafting the laurel, or cherry bay, an ever-green, on the common cherry; and the ilex, or ever-green oak, on the oak.

DEHISCENTIA, *dehisco*, to gape wide. The bursting open of the *anthers* for dispersing the male-dust; as likewise of the seed-vessel called a capsule, for discharging the seeds when ripe. *Vide* ANTHERA and CAPSULA.

Most capsules split or open at top; most *anthers* burst on the sides.

DENOMINATIO, the giving or imposing of names—One of the principal foundations of practical botany; which, like the establishment of proper characters, has been a necessary consequence of the methodical division into classes, genera, and species.

Linnæus's rules, with respect to the generic and specific names of plants, and the great improvements made by that author, in this very important part of botany, are particularly mentioned under the main article, NOMINA, whither we refer the reader.

DENUDATÆ, (*denudo*, to strip naked.) The name of an order in the former editions of Linnæus's Fragments of a Natural Method, consisting of plants whose flowers are naked, that is, want the *Perianthium*, or flower-cup, although they burst from a *spatha*, or sheath. *Vide* SPATHA.

The genera in this order were four; crocus, meadow-saffron, bulbocodium, and gethyllis. They are now mostly removed to the order SPATHACEÆ, which see.

DESCRIPTIO. A description,—a detail of all the parts and qualities of any object, compared or not compared with those of another:—applied to botany, the natural character of the whole plant, including all the external parts. In this respect the description of the species is distinguished from the specific difference, which regards the essential or striking characters only.

A perfect, or complete description is not confined to the principal parts of plants, as the root, stem, leaves, and fructification; but includes, likewise, whatever is conspicuous in their external appearance; as the foot-stalks of the leaves and flower; the *stipulæ*, or scales; the *bractææ*, or floral leaves; the glands, or vessels of secretion; the weapons of offence and defence; the buds; the complication, or folding
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ing of the leaves within the buds ; and the habit or general appearance of the whole plant.

The order to be observed in the description, is that of Nature, proceeding from the root to the stem ; next the branches ; then the foot-stalks, leaves, flower-stalks, and flowers. The impropriety would be manifest, to describe the leaves, or their foot-stalks, before the stem, from which they proceed ; or the stem before the root, which serves to elevate it.

Further, the description of each separate part should be contained in a separate paragraph ; that the parts may appear equally distinct in description, as they are in the plant itself. The names of the different parts too ought to be delineated in large letters, that they may the more easily be discovered by the reader ; and that omissions in the description, if there are any, may be more readily perceived and supplied. Nothing, in fact, can be more tedious and unentertaining than a very large description, that is neither divided into paragraphs, nor distinguishes the parts of the plants in the manner just recommended.

A description, to be complete, ought equally to avoid the extremes of prolixity and excessive brevity. Colour, dimension, and other circumstances, which are subject to change, are never to be much insisted on : on the other hand, no striking characters, no essential parts, however minute, such as the *stipulæ*, or scales, the *bractææ*, the *glandulæ*, the hairs, and downy appearances on plants, and such like, are, from a studied and faulty brevity, to be excluded from the description of any species whatever.

Lastly, a scientific description should employ only terms of art, if these are sufficient ; and delineate all the parts, according to their number, figure, proportion, and situation.

The intelligent reader will discover, whether in describing the several natural orders that occur in the course of this work, I have practised the rules just delivered. Some difference, however, obtains in the mode of describing an assemblage or family of plants, and a particular species.

The most complete specific descriptions are those of Clu-

fius, Columna, Bauhin, Rheede, Ray, Rumpfius, Plumier, Dillenius, Vaillant, Scheuchzer, Linnæus in his *Hortus Cliffortianus*, and Haller,

DETERMINATIO *Foliorum*. Vide FOLIUM,

DIADELPHIA, from *dis*, twice, and *ἀδελφία*, a brotherhood; two brotherhoods; the seventeenth class in Linnæus's Sexual System, consisting of plants whose flowers are hermaphrodite, and have the stamina, or male organs, united below into two sets of cylindrical filaments.

This class, which is a true natural order or family, corresponds to the *Leguminosæ*, or plants having pods, of Morison, Hermannus, Boerhaave, Ray, and Royen; the *tetrapetali irregulares* of Rivinus and Christopher Knaut; the *tetrapetali diffformes* of Christian Knaut; and the *Papilionacei*, or butterfly-shaped flowers, of Tournefort and Pontedera.

The classical characters of this numerous and similar assemblage of plants, will be delivered under Linnæus's Natural Order PAPILIONACEÆ, which see.

The orders, or secondary divisions, in this class, are founded on the number of stamina, considered as distinct. Some pea-bloom, or butterfly-shaped flowers, have five stamina, or male organs, as Monneria; some six, as Fumatory; some eight, as Milk-wort; some ten, as Broom, Bladder-Sena, Lupine, Lady's-Finger, Vetch, and the far greater number of butterfly-shaped flowers. It is only the last order that is included in the natural family *Papilionaceæ*; the remaining four genera are distributed among other families, to which they have, at least, an equal alliance. Fumatory and *Monneria* are arranged under the order *Corydales*; Milk-wort, under *Lomentaceæ*.

I cannot help remarking, before I conclude this article, that the names given by former botanists to the extensive class of plants in question, are much more characteristic of their nature and appearance, than that of *Diadelphia*.

In fact, the figure of the flowers and fruit never varies: the latter being always of the pod kind; the former of the butterfly-shape. On the other hand, the two sets of united stamina, the only classic character expressed in the Linnæan

title, are never to be traced without difficulty: for one of the sets only is properly united; the other consisting of a single filament, which, in most plants, adheres so closely to its kindred set, that it cannot be separated without the application of a pin or needle for that purpose. In some even, no separation can be effected by this means.

DIÆTETICI. By this name Linnæus distinguishes a class of Medical Botanists, who pronounce of the qualities of vegetable food, by taste and smell. Such are Quercetanus, Nonnius, Behren, and Lister.

DIANDRIA, (from *dis*, twice, and *ἀνρ*, a man) the name of the second class in Linnæus's sexual system, consisting of hermaphrodite plants, which, as the name imports, have flowers with two *stamina* or male organs.

The orders in this class are three, derived from the number of styles or female parts. Most plants with two stamens have one style, as Jessamine, Lilac, Privet, Veronica, and Bastard Alaternus. Vernal grass has two styles; Pepper, three.

DIANGLÆ, (from *dis*, twice, and *ἀγλσ*, a vessel) the sixteenth class in Boerhaave's system, consisting of plants whose seeds are contained within two capsules, or within a single capsule having two cells. It is exemplified in purple loose-strife.

DIANTHERÆ (from *dis*, twice, and *antheræ*, the tops of the stamens.) The name of an order or secondary division in Ludwig's Improved Method, consisting of plants, which, to the classic character, whatever it is, add the circumstance of having two stamens or male organs.

DICOTYLEDONES (from *dis*, twice; and *Cotyledon*, a seed-lobe or seed-leaf) plants whose seeds have two side-lobes, and consequently rise with two seminal leaves. Most plants are of this kind. *Vide* COTYLEDONES.

In the lip and masqued flowers, the *Didynamia* of Linnæus, and in plants, whose seed-vessel is of the apple, cherry, or pod kind, the seed-leaves rise unaltered; that is, without any farther extension or development, than when they made part of the seed.

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In mallow, and the cross-shaped flowers, they appear double; in buck-wheat they are rolled up; in cotton, folded or plaited; in salt-wort, glass-wort, ceratocarpus, malabar night-shade, and all the pot-herbs, they are spiral, or twisted like a screw.

DIDYNAMIA, (from *dis*, twice, and *δύναμις*, power,) two powers; the name of the fourteenth class in Linnæus's Sexual Method, consisting of plants with hermaphrodite flowers, which have four stamina or male organs, two of which are long, and two short.

This numerous class of plants contains two natural assemblages or families, and consists of flowers, which, besides the circumstance expressed in the title, have one very irregular petal, sometimes divided into two dissimilar lips, sometimes shaped like a masque. From an attention to the different figure of this grinning or gaping petal, former botanists, who, perhaps, never dreamt of the sex of plants, or, if they did, thought of nothing less than founding a system upon it, arranged the plants in question under two classes, which they considered as having nothing in common; the number of the stamina, and their proportion being totally disregarded. In fact, the two orders, which subdivide the class Didynamia, and correspond to the same number of classes in most botanical systems, are so very dissimilar, that, I believe, it would have been difficult, except from the number and proportion of the stamina, to have reduced them under one head, with a single circumstance of resemblance. The petals, seed-bud, seed-vessel, and seeds, are totally different in the two orders. The habit too, or general appearance of the plants, is perfectly different; what two things, in fact, can be more distinct than mint and bear's breech? or marjoram and fox-glove?

Linnæus himself is so sensible of the few relations that subsist betwixt these two orders of plants, that, in his Fragments of a Natural Method, he is obliged to separate them, and have recourse to two divisions, the one from Ray, the other from Tournefort; although in the *Genera Plantarum*, he considers the class *Didynamia* as having, independently of
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that expressed in the title, particular classic characters; that is, a variety of relations, which approximate the plants in that particular class to one another.

The two orders in the class *Didynamia* are strongly marked; being founded upon the presence or absence of the seed-vessel. Their names are borrowed from Hermannus. The order *Gymnospermia* consists of plants, which, as mint, hyssop, savory, lavender, and other aromatics, have four naked seeds lodged in the bottom of the calyx without any proper seed-vessel. These are the *Labiati*, or lip-flowers, of Tournefort and Pontedera; the *Verticillatæ*, or plants that flower at the joints, or whose flowers are placed in whirls round the stalk, of Hermannus, Boerhaave, Ray, and Linnæus in his *Fragments of a Natural Method*. *Vide VERTICILLATÆ*.

The second order, termed *Angiospermia*, consists of plants, whose seeds, as the name imports, are lodged in a pericarpium or seed-vessel. To this order belong fig-wort, fox-glove, bignonia, eye-bright, toad-flax, calve's linout, oily purging grain, agnus castus, bear's breech, and several others, *Vide ANGIOSPERMIA*.

These plants are the *Personatæ* or masqued flowers of Tournefort, and make part of the third class in his system. Under the same name Linnæus arranges them in his *Fragments of a Natural Method*. *Vide PERSONATÆ*.

Professor Royen, in his *Floræ Leydenfis Prodrömus*, has traced the outlines of what he calls a natural method, in which we find the class *Didynamia* of Linnæus distinguished as one entire natural family or order, under the name *Ringentes*, or the grinning flowers. As I never suffer my admiration for any man, however distinguished, to betray me into the fatal complaisance of adopting his errors; I must beg leave to differ from both the learned doctors, and to consider the class *Didynamia*, as composed of two natural orders of plants, that have not the least affinity together.

The lip flowers, which constitute the first order, are described under the article *VERTICILLATÆ*; those with a masque, which constitute the second, under *PERSONATÆ*.

DIFFORMIS flos (from *dis*, twice, and *forma*, a form) having

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having two different forms, irregular; the term is expressive of the inequality and irregularity of the petals. It is used by Jungius and Christian Knaut; and is synonymous to the *Anomalous flos* of Tournefort and Pontedera, the *Irregularis flos* of Rivinus, and the *Corolla irregularis* of Linnæus.

The term is exemplified in the masked flowers, aconite, columbine, violet, fumatory, lark-spur, orchis, and other plants in which the petals are very irregular and dissimilar.

DIFFORMIS is the name of a series of classes in Christian Knaut's Method, consisting of plants which have one or more irregular petals. Among many others, these classes comprehend all the grinning and pea-bloom flowers; they correspond to the division in Rivinus's method, termed *Irregulares*.

DIGYNIA (from *dis*, twice, and *γυνή*, a woman). The name of an order or secondary division in each of the first thirteen classes, except the ninth, in Linnæus's Sexual Method; consisting of plants, which to the classic character, whatever it is, add the circumstance of having two styles or female organs.

DICÆCIA (from *dis*, twice, and *οικία*, a house or habitation,) two houses. The name of the twenty-second class in Linnæus's Sexual Method, consisting of plants, which, having no hermaphrodite flowers, produce male and female flowers on separate roots. These latter only ripen seeds, but require, for that purpose, according to the Sexualists, the vicinity of a male plant, or the aspersions of the male dust. From the seeds of the female flowers are raised both male and female plants.

The plants then in the class Dicæcia, are all male or female; not hermaphrodite as in the greater number of classes; or with male and female flowers upon one root, as in the class *Monæcia* of the same author.

Accurate as the Swedish Botanist undoubtedly is, there are many plants dispersed through the different classes in the *Genera Plantarum*, which have male and female flowers on distinct roots, and therefore ought, in strict propriety, to have been reduced under the class *Dicæcia*. Linnæus, sensible

sible of the weak side of his system, has endeavoured to anticipate and destroy the force of this criticism, by insinuating that such plants could not properly enter into this class, because the circumstance alluded to does not run through the genus, but is peculiar to some particular species only. To an unexperienced botanist the reason is satisfactory; but examined with attention, it is resolved into a mere begging of the question; for, if the sex of plants be a doctrine of such importance in botany, as to justify the joining together of things which Nature never joined, and the separation of others which were never meant to be disjoined; it certainly authorized the great reformer of the science to erect several genera out of one, especially when the leading principles of his system required it. The liberties he has taken with the genera of Ray, Tournefort, Boerhaave, and other eminent botanists, are well known. In fact, what a perplexed study is Botany now rendered, by the prodigious multiplication of synonymous genera! To whom then is this mighty confusion owing? Why, in a great measure, to Linnæus, who, by splitting some genera, incorporating others, and introducing a variety of new names, has rendered every other system unintelligible, without the assistance of his nomenclature.

When such a renovation of the genera was to take place, where would have been the impropriety of making distinct genera of most of, or all the species, to be afterwards enumerated, when they could not be considered as mere species without infringing the fundamental laws of his system? To take an example; a species of campion, the *lychnis* of Linnæus, bears male and female flowers on separate plants. I shall suppose that, with the assistance of the *Genera Plantarum*, or *Systema Naturæ*, I would explore the class, order, genus, and species of a plant of the male *lychnis*, which, by chance, I have found in the fields. To determine the class, I reckon the number of stamina; which finding to be ten, of an equal length, and united neither above nor below, I am almost ready to refer my plant to the tenth class, *Decandria*, when I reflect, that, besides the characters

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just mentioned, the class in question bears hermaphrodite flowers. Upon examining the plant with a view to this particular, I can discover no style, nor seed-bud; the flower then, is not hermaphrodite, but male; consequently cannot belong to the class under which I was rashly going to arrange it. I now examine the whole plant, if, perchance, I can discover any female flowers placed promiscuously with the male upon the same root; a circumstance which would immediately determine my plant to the class *Monœcia*: but not being able, after the strictest search, to discover any difference in point of sex, I conclude the plant to be male, and to belong to the class *Diœcia*, in which male and female flowers are placed apart on separate plants. Having, in this manner, detected the class, I proceed to explore the order, which I soon discover to be the ninth, *Decandria*, that order containing such *diœcious* plants, if I may use the expression, as have their male flowers furnished with ten stamina. I have now reduced my plant to one of four genera; for the order in question contains no more; these are Papaw, (*Carica*) *Kiggelaria*, Indian Mastick (*Schinus*) and myrtle-leaved sumach (*Coriaria*). These names begin to stagger me; for to my belief and even knowledge, the plants just now mentioned are all natives of very warm countries, and are, besides, of the tree and shrub kind: whereas the plant to be explored rises with an herbaceous stalk, that is not above two or three feet high. But supposing that I am such a novice in the science, as to be ignorant of these particulars; I proceed, satisfied that I have detected the class and order, to ascertain the genus. I begin with *Carica*; but soon find the impropriety of arranging the plant under that genus, which has only one funnel-shaped petal; whereas my unknown flower has five distinct petals, with long claws. The next genus *Kiggelaria*, although somewhat similar in the calyx and petals, has a glandular nectarium in the bottom of the flower, of which I can discover no trace in the other.—The filaments of the stamina too are very short; those in the plant to be discovered, very long. I proceed to *Coriaria*, the next genus, which is quickly dismissed on account of

the minuteness and divisions of the calyx : and comparing my plant with *Schinus*, the last genus in this order, I can discover nothing to convince me that I have yet detected the genus of the flower in question. What remains then but to consider it as a new genus, which Linnæus has never seen, and consequently never described ? In this belief, I discover my new acquisition, as I imagine it, to some skilful botanist, who, surprized at my ignorance, assures me that it is a common weed, and grows wild in many parts of England ; that it belongs to the class *Decandria*, and not *Diœcia*, in the Sexual Method, although it possesses the characters of the latter, and not of the former ; but that as those characters are only to be found in the particular species under consideration, the founder of that method did not chuse to split the genus, and arrange its several parts under classes, so very distinct and remote : though, upon more frivolous grounds, he had torn and mangled, without reserve, the genera of former botanists, when they did not coincide with his own principles or opinions.

For examples of the impropriety complained of, the reader is referred to the following species, which, by Linnæus, are arranged under classes and genera containing hermaphrodite flowers.

Valeriana Dioica.
 Rhamnus Catharticus.
 ————— Infectorius.
 ————— Alpinus,
 Rhus vernix.
 Rumex tuberosus.
 ————— Multifidus.
 ————— Acetosa.
 ————— Acetofella.
 ————— Aculeata.
 Lonicera Dioica.
 Laurus nobilis.
 Guilandina Dioica.
 Cucubalus Otites.

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Lychnis Dioica.
 Phytolacca Dioica.
 Spiræa Aruncus.
 Rubus Chamæmorus.
 Clematis Virginiana.
 ——— Dioica.
 Thaliætrum Dioicum.
 Napæa Dioica.
 Gnaphalium Dioicum.
 Gypsophila paniculata.
 Phylica Dioica.

The three following species are improperly referred by Linnæus to the class *Monœcia*, which contains plants with male and female flowers upon the same root.

Carex Dioica.
 Urtica Dioica.
 Morus Nigra.

It is worthy of observation, that not a single species in the rough-leaved plants of Ray, and the lip, masqued, cross-shaped, and pea-bloom flowers of Tournefort is found to differ in point of sex. These are true natural assemblages, accurately defined by fixed and precise characters. For the same reason we have been able to trace but one deviation of Nature in the compound flowers; I mean, in a species of rud-weed. As deviations, however, or exceptions to the general law of their nature, I would remove all such species from a class or order, in which, at best, they appear but as vegetable monsters; and either place them apart in an appendix to the work, under the title of Anomalous, that is, irregular plants which do not commodiously arrange themselves under any of the foregoing classes, as Ray, Tournefort, and other eminent botanists have done: or refer each species as a genus, if necessary, to the particular class, to which, in strict conformity to the principles of the system, it can only belong.

The orders in the class *Dioecia* are fourteen, founded upon the number, union and situation of the stamina in the
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male plants: their names are those of the classes containing hermaphrodite flowers. *Najas* has one stamen or male organ; willow, two; poets casia, three; mistletoe, and sea-buckthorn, four; pistacia-nut, spinach, and hop, five; rough bindweed (*Smilax*) and *Dioscorea*, six; poplar, and rose-root, eight; mercury, nine; papaw, and Indian mastick, ten; moonseed, and bastard-hemp, twelve. In *Cliffortia*, the stamina are numerous; in juniper, yew, and shrubby horse-tail, they are united by their filaments into a pillar; in butcher's-broom, they are united by the *anthers* or tops; and in *Clutia*, says Linnæus, they are attached to the middle of a very long cylindrical style in the centre of the male flowers. Here is another impropriety; the very name of the order under which *Clutia* arranges, (*Diœcia Gynandria*) is absurd. For if a genus of plants be truly *diœcious*, that is, contain male and female plants on different roots, the stamina of the male flowers cannot be inserted into the style or female organ, because such female organ is not present. On the other hand, if the female organ, or any of its parts, be present and conspicuous, the plant is not *diœcious*, but hermaphrodite. In the class *Monœcia*, which contains plants with male and female flowers on the same root, the order in question again occurs, and with equal impropriety as in the present case. Bastard orpine, (*Andrachne*) the single genus in that order, is nearly allied to *Clutia* in the class *Diœcia*.

DIPETALI (from *dis*, twice, and *πεταλον*, a petal,) having two petals; the name of two classes in Rivinus's method, consisting of regular and irregular flowers with two petals. Enchanter's night-shade and *Commelina* furnish examples.

DIPSACEI, (from *Dipsacus*, teasel); the name of an improper division in Vaillant's Arrangement of the Compound Flowers, consisting of plants, whose flowers, like those of teasel and scabious, form a head, and are contained within a common calyx. These plants differ from the Compound Flowers of Linnæus, in having their stamina free, or distinct both at bottom and top: the partial flowers too are frequently furnished with a proper calyx. They correspond to

Linnaeus's aggregate flowers properly so called. *Vide* AGGREGATUS *flos*. Besides those already mentioned, viburnum, honey-suckle, and valerian furnish examples.

DISCOIDEÆ, (from *Discus*, the middle of a radiated compound flower) the name of a class in Ray's method, which includes a great part of the *Radiati* of Tournefort. A radiated discous flower has several semi-florets placed in the circumference like so many rays round the disk; such are groundsel, feverfew, aster, golden rod, daisy, and many others.

A naked discous flower has no rays or semi-florets in the circumference, as cudweed, foreign colt's-foot, *Cotula*, and ploughman's spikenard.

DISCOIDEÆ, is likewise the name of division in Linnaeus's Arrangement of the Compound Flowers.

DISCUS, (Gr. *Δισκος*, *discus*, a quoit, dish, and from its flat and round appearance, the circumference of the sun.) This term in the modern Botanical Nomenclature signifies the centre of a radiated compound flower, and generally consists of small florets with a hollow regular petal. It is commonly surrounded by large, flat, tongue-shaped petals in the circumference or margin; as in daisy, groundsel and leopard's bane; sometimes the circumference is naked, as in cotton-weed, and some species of colt's-foot.

DISCUS *folij*, the whole surface of the leaf.

DISSEMINATIO. The various and wonderful contrivances of Nature to disperse and scatter abroad the seeds of vegetables, for the purposes of increase. For particulars on this curious subject, the reader is referred to the article SEMEN.

DISSEPIMENTUM, (from *Sepes*, a hedge.) By this name Linnaeus denominates the partitions, which, in dry seed-vessels, as capsules and pods (*Siliqua*) divide the fruit internally into cells.

DODECANDRIA (from *δωδεκα*, twelve; and *ἀνρ*, a man.) The name of the eleventh class in Linnaeus's Sexual System; consisting of plants with hermaphrodite flowers, that, according to the title, have twelve stamina or male organs.

organs. This class, however, is not limited with respect to the number of stamina. Many genera have sixteen, eighteen, and even nineteen stamina; the essential character seems to be that, in the class in question, as in *Polyandria*, the 13th, the stamina are inserted into the receptacle: whereas in the intermediate class, *Icosandria*, which is as little determined in point of number as the other two, they are attached to the inside of the calyx.

The orders in this class, which are six, are founded upon the number of the styles, or female organs. Asarabacca, mangostan, storax, purple loose-strife, wild Syrian rue, and purslane, have one style; agrimony and heliocarpus have two; burning thorny plant, and bastard rocket, three; *Glinus*, five; *Illicium*, eight; and houseleek twelve.

DODRANS, a term of measure. *Vide* MENSURA.

DRUPA, and DRUPPA, (used by Pliny for an olive waxing black with ripeness, and ready to fall off the tree); a species of seed-vessel that is succulent, has no valve or external opening like the capsule and pod, and contains within its substance a stone or nut. The cherry, plumb, peach, apricot, and all stone fruit, are of this kind.

The term, which, as we have seen, is of great antiquity, is synonymous to Tournefort's "fructus mollis officulo," soft fruit with a stone; and to the *Prunus* of other botanists.

The stone, or nut, which, in this species of fruit, is surrounded by the soft pulpy flesh, is a kind of woody cup, containing a single kernel or seed, (Nucleus.)

The reader will be mistaken, if he imagines that the definition just given will apply to every seed-vessel denominated *Drupa* in the *Genera Plantarum*. The almond is a *Drupa*, so is the seed-vessel of the elm tree and the genus *Rumphia*; though far from being pulpy or succulent, the first and third are of a substance like leather; the second like parchment. The same may be said of the walnut, Pistacia-nut, *Guetarda*, *Quisqualis*, jack-in-a-box, and some others.

Again, the seeds of the elm, *Schrebera*, *Flagellaria*, and the mango-tree, are not contained in a stone. The seed-

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vessel of burr-reed is dry, shaped like a top, and contains two angular stones.

This species of fruit, or more properly seed-vessel, is commonly roundish, and, when seated below the calyx, or receptacle of the flower, is furnished, like the apple, at the end opposite to the foot-stalk, with a small umbilicus or cavity, produced by the swelling of the fruit before the falling off of the flower-cup.

DRUPACEÆ (from *Drupa*) an order of plants in the former editions of Linnæus's *Fragments of a Natural Method*, consisting of the almond, peach, plumb, apricot, cherry, and bird-feed, which have that species of fruit-vessel called by Linnæus, *Drupa*. *Vide supra*.

These plants are now reduced to two genera, *Amygdalus* and *Prunus*, and make part of the natural order **POMACEÆ**, which see.

DUMOSÆ, (from *Dumus*, a bush) bushy plants; the name of the forty-third order in Linnæus's *Fragments of a Natural Method*; consisting of a number of shrubby plants, which are thick set with irregular branches, and bushy.

List of the Genera contained in this Natural Order.

S E C T I O N I.

Thickset bushy Shrubs, with Leaves placed alternate.

Linnæan Genera.			English Names.
<i>Achras,</i>	—	—	Sapota.
<i>Cassine,</i>	—	—	Cassioberry-bush, and South-Sea or Paraguay tea.
<i>Ceanothus,</i>	—	—	New-Jersey tea.
<i>Celastrus,</i>	—	—	Staff-tree.
<i>Chrysophyllum,</i>	—	—	Star-apple, and damson-tree.
<i>Fagara.</i>			
<i>Ilex,</i>	—	—	Holly.
<i>Phytica,</i>	—	—	Bastard alaternus.

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Linnæan Genera.		English Names.
<i>Prinet,</i>	—	Winter-berry.
<i>Rhamnus,</i>	—	Buckthorn, alaternus, jujube-tree.
<i>Rhus,</i>	—	Sumach, poison-tree, Varnish-tree.
<i>Schinus,</i>	—	Indian mastic.
<i>Sideroxylon,</i>	—	Iron-wood.

SECTION II.

Thickset bushy Shrubs, with Leaves placed opposite.

<i>Cullicarpa,</i>	—	Johnsonia.
<i>Eunymus,</i>	—	Spindle-tree.
<i>Sambucus,</i>	—	Elder.
<i>Tomex.</i>		
<i>Viburnum,</i>	—	Plant mealy-tree, or way-faring tree, lauristinus and gelder-rose.

Habit and Structure of the Plants of this Order.

The plants of this order are all of the shrub and tree kind, thick and bushy, and rise from six to twenty-five, thirty, and even forty feet high. Many of them too, as bastard alaternus, holly, iron-wood, new-jersey tea, star-apple, viburnum, winter-berry, and some others, retain their beautiful leaves during the whole year.

The **ROOTS** are branched and fibrous.

The **STEMS** are cylindric; the young branches sometimes angular.

The **BUDS** are naked, that is, without scales, in the ever-green shrubs of this order; covered with scales in most of the others.

The **LEAVES**, which in some genera are simple, in others compound, are placed alternate in plants of the first section; opposite, in those of the second. In cassioberry-bush, some of the leaves are almost opposite.

From the base of the leaf of the gelder-rose, a species of

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viburnum, proceed a number of small glands or secretory vessels.

Holly, elder, and spindle-tree have two *STIPULÆ* or scales, one on each side of the branches; in the two last they are slender like hairs, and almost imperceptible.

The branches of staff-tree, and of some of the species of *Rhamnus*, are terminated by a thorn, which disappears by culture. Jujube tree, and Christ's-thorn, two other species of *Rhamnus* have, at both sides of the origin of the footstalk of the leaves, two unequal spines; the one of which is erect and large; the other, smaller and curves downwards.

In *Fagara* there are placed along the branches, and ribs of the leaves, a number of prickles, which being slightly attached to the bark of the plants, fall off quickly. In holly, the leaves are thorny.

The leaves and branches of the genus *Tomex* are covered with soft downy hairs, which have a silver-white appearance. This kind of pubescence is termed *tomentum*, whence the genus derives its name.

The FLOWERS are mostly hermaphrodite. Indian mastick, and some species of buck-thorn and sumach, have male and female flowers upon different roots: holly too, staff-tree, *fagara*, and alaternus, a species of buck-thorn, sometimes produce male flowers on one root, and hermaphrodite flowers on another; the last has sometimes male and female flowers on the same root.

The flowers proceed from the angles of the leaves, either singly, as in winter-berry; or in clusters, as in buck-thorn, johnsonia, cassioberry-bush, and iron-wood; or they terminate the stem in that sort of flowering head called a *CORYMBUS*; as in bastard alaternus.

The *CALYX* is generally very small, placed below or around the seed-bud, and consists of one leaf, with four, five, or six divisions, which are permanent, that is, accompany the seed-bud to its maturity. The genus *Rhamnus* has no calyx. In sapota, it is composed of six distinct leaves. In elder and *viburnum*, it is placed above the seed-bud.

The *PETALS* are, in number, from one to five; in buck-thorn

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thorn and sapota, five scales, which serve for a *nectarium*, are inserted into the chaps (*faux*) of the tube of the petal.

The STAMINA are either four, as in *johnsonia* and holly; five, as in sumach, spindle-tree, and the greater number of plants in this order; six, as in sapota and winter-berry; or ten, as in Indian mastick.

The SEED-BUD is generally roundish, and placed within the flower; in elder and viburnum it is placed below it.

The STYLE is generally single, and sometimes wanting, as in Indian mastick, sumach and viburnum: the latter, as well as the elder, has a gland or vessel of secretion, in its place.

The STIGMA, or summit of the style, is either single, as in iron-wood and buckthorn; or triple, as in sumach, viburnum, cassioberry-bush, and elder.

The SEED-VESSEL in this order is generally a berry; sometimes a dry capsule, as in spindle-tree and bastard alaternus: in iron-wood, the seed-vessel is of the cherry kind; in sapota, of the nature and substance of an apple.

The SEEDS are generally single and egg-shaped. In the spindle and staff-trees, they are wrapped up in a proper coat or *arillus*. *Vide* ARILLUS.

These plants have no striking classical character; I have, however, after the example of Linnæus, considered them as a natural order, though their relations are not so numerous as strictly to entitle them to that appellation.

The berries, bark, and flowers of many of these plants are purgative, and act particularly on the lymph and bile.

Sapota, sometimes called Mammee Sapota, is very common in the West India islands, where the trees are planted in gardens for the fruit, which, by many persons, is much esteemed. The flowers, which are of a cream colour, are succeeded by an oval top-shaped apple covered with a brownish husky skin, under which is a thick pulp, of a russet colour, and very luscious taste, including one or two hard oval nuts or stones. It is called Natural Marmalade,

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from its resemblance in taste to marmalade of quinces. The stones or kernels of this fruit, taken in emulsion, are a powerful aperient, and reckoned specific in gravelly complaints.

The leaves of *Johnsonia*, which grows plentifully in South Carolina, are used with success in dropical cases.

A decoction of the root of *Ceanothus Americanus*, or New-Jersey tea, is esteemed a certain remedy, not only in slight gonorrhœas, which it stops in two or three days without any bad consequences; but also in the most inveterate venereal complaints. A large vessel must be employed in this decoction, because the plant, in the time of boiling, throws up a great quantity of froth, which must not be lost. The inhabitants of North America, where this shrub naturally grows, dry the young leaves and infuse them in water like tea; whence the name of New-Jersey tea, by which title the seeds are generally brought into Europe.

The root of the staff-tree, being powdered, is used by the negroes of Senegal as a specific against gonorrhœas, which it is said to cure in eight, and sometimes at the end of three days. An infusion of the bark of a species of staff-tree, which grows in the isle of France, is said to possess the same virtues.

Star-apple is garnished with oval leaves that are smooth above, and of a beautiful gold colour, shining like satin on their under side; whence the name *Chrysophyllum* or golden leaf, by which it is known among botanists.

The wood of the spindle tree is yellow, and used in works of sculpture. By the musical instrument makers it is employed for tothing of organs and virginal keys. The branches are cut into tooth-picks and skewers, and spindles are made of the wood, whence the tree derives its title. In some countries, says Miller, it is called dog-wood.

From the *arillus*, or proper covering of the seeds of the spindle-tree, is drawn a very beautiful red tincture. The powder of the capsules, sprinkled upon the head and cloaths is said to destroy lice and other vermin.

The capsules, or dry seed-vessels of the genus *sagara*, are used by the Africans for pepper.

Iron-wood is so called from its great weight, its hardness, and the closeness of its grain; for it is proof against all weather, and scarce known to suffer any decay in several ages; it is so heavy, that it will sink in water.

Of the bark of common holly is made the common bird-lime, which is better than that made of misletoe. The wood is very white, and admits of an exceeding fine polish. It is chiefly made into hones for whetting of razors.

The berries of narrow-leaved ever-green privet, the *Rhamnus Alaternus* of Linnæus, the *alaternus angustifolia* of Tournefort, are sold in France by the name of Avignon-berries for the use of painters, who prepare from them a yellow colour or pigment. These berries are, by some, erroneously imagined to be the fruit of the dwarf buckthorn, or *Rhamnus Catharticus Minor*.

The Egyptian thorn, the *cœnoplia spinosa* of Caspar Bauhin; the *nabca paliurus athenæi* of Prosper Alpinus; the *naba* or *nabka* of the Arabians; and the *rhamnus spina christi* of Linnæus; is supposed, by many travellers, to be the tree from which the crown of thorns that was put on the head of our Saviour, was made. It is very common in the eastern countries, particularly in Palestine. This plant, says Hasselquist, was very proper for the purpose to which it is supposed to have been applied, as it has many small sharp spines, or thorns, well adapted to give pain. The crown, too, might be easily made of the soft, round and pliant branches with which this tree or hedge is furnished. What in Hasselquist's opinion seems to be the greatest proof of the supposed use of this plant, is, that its leaves have a great resemblance to those of ivy, with which emperors and generals were wont to be crowned. The enemies of Christ would, perhaps, desire to have a plant somewhat resembling that which was used in triumphs and times of festivity, that there might be calumny and reproach even in the punishment.

Syrup of buckthorn, which is prepared of the berries of the purging or common buckthorn, is reckoned a good medicine in the dropsey, jaundice, itch, and other eruptions of the

the skin. It is of a very disagreeable bitterness, causes thirst, and is proper for such as are easy to work upon, and whose strength has not been impaired by continual diseases. The berries may be easily known by counting their seeds, which are four in number; and, by rubbing the juice upon white paper, which it stains of a green colour.

Of the juice of these berries the French prepare a beautiful green pigment or colour, known among painters by the name of Verd-de-veffie.

Half an ounce of an infusion of the inner bark of the berry-bearing alder, the *Rhamnus Frangula* of Linnæus, or a dram of the powder, proves as violent a purge as rhu-barb. The berries are often brought to market, and imposed upon the ignorant for buckthorn-berries. They may, however, be easily distinguished; the berries of buck-thorn having generally four seeds; those of frangula, but two.

Jujube, which Linnæus has joined along with alaternus, berry-bearing alder, and Christ's thorn, to his genus *rhamnus*, by the name of *rhamnus Zizyphus*, is a native of the warm parts of Europe, particularly the south of France, and Italy, having been transported thither from Syria, as Linnæus observes, by Sextus Pampinius, in the time of the emperor Augustus. The fruit, which is about the size of a plumb, is reckoned pectoral, warm and moistening; it has an agreeable taste, though somewhat insipid, and was formerly used in ptisans and pectoral apozems; but is now seldom to be found in the shops. In Italy and Spain, jujubes are served up in desserts as a dry sweet-meat, during the winter season.

A decoction of the roots and branches of the common jujube is said to be successful in venereal complaints.

The branches and leaves of the elm-leaved sumach, or *Rhus Coriaria* of Linnæus, are used instead of oak-bark for the tanning of leather; the Turkey leather is said to be all tanned with this shrub. The leaves, berries, and seeds of this species of sumach, are used in medicine; they are astringent, refreshing and antiseptic; the berries are used in decoction for stopping fluxes and violent hæmorrhages.

Virginian

Virginian fumach is covered with a fine soft velvet down; the young branches resemble, both in colour and texture, a stag's horn; by which appellation it is generally known among the inhabitants of North America. This sort is likewise used for tanning leather: and the roots, says Miller, are often prescribed in medicine, in the countries where the tree naturally grows.

Very good vinegar is made of the infusion of the fruit of an American species of fumach, which, for that reason, is generally known by the name of vinegar-tree. Venice, or red fumach, the *Rhus Cotinus* of Linnæus, is more used by the curriers than in physic; it is said, however, to be vulnerary and astringent; the wood dyes a fine yellow colour.

Most species of fumach abound with a white milky juice, which is reckoned poisonous: that of *Rhus Vernix*, or poison-ash, is esteemed for its quality of staining; and the plant, from that circumstance, adjudged to be the true varnish-tree, described by Kæmpfer in the *Amœnitates Exoticæ*, by the name of Sitz-dfiu.

This tree, the *Toxicodendron foliis alatis, fructu rhomboide* of Dillenius, the poison-tree of Kalm, rises with few branches to the height of a willow, and grows naturally in Japan and North America. The bark is hoary, rough with warts, and easily parts from the wood, which is very brittle, and resembles that of willow. The pith is copious. The shoots are long, thick, and covered at the extremity with leaves placed without order. These are winged with an odd one. The lobes, pinnæ, or lesser leaves, are slender, egg-shaped, of a dark green, smooth on the upper surface, hoary below, and stand opposite upon very short foot-stalks. The juice contained in the leaf being rubbed upon paper, immediately tinges it with an iron colour. The flowers proceed in clusters from the arm-pits of the leaves. These clusters are loosely branched, and slender, being composed of small yellow flowers, of a sweet and very grateful smell, somewhat resembling that of the flowers of the orange-tree. The fruit is bunched, compressed into a
rhomboidal

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rhomboidal figure, covered with a thin shining membrane, and very hard when ripe.

The bark of varnish-tree being notched with a knife, effuses a milky substance, mixed with a chrySTALLINE humour exuding from other ducts, which blackens by the admission of air. This substance, which is likewise produced from the branches, pedicles and ribs of the leaves, has no perceptible taste, unless a little heat without any acrid sensation. The tree, however, it is affirmed, emits poisonous exhalations so exceeding strong, as to produce in boys who play about it violent inflammations in different parts of the body—effects which, in others, have attended the handling of the wood. They collect the varnish, by wounding the trunks of the trees (generally those of the age of three years) with a few notches, or gentle incisions; from which the liquor flowing is received into vessels placed there for that purpose: the incisions being repeatedly continued in fresh places, till the tree is left wholly without juice. It is then cut down to the root, which quickly yielding a new offspring, is, at the end of three years, again subjected to a new incision for the collection of more varnish.

Japan produces the noblest and most precious varnish, but in so small a quantity, that it would not even suffice for their own use, without the assistance of a more ignoble species brought from Siam, and termed Nam-Rak, which serves as a foundation to the other. The tree which furnishes the inferior sort is the anacardium produced in the province Corfama, and in the kingdom of Cambodia. The trunks being perforated, and a tube inserted to receive it, the liquor is produced in such abundance as suffices for staining the utensils of China, Tonquin, and Japan. Varnish of Japan, after being collected from the tree, as above-described, is filtrated through a double fold of paper almost as thin as a spider's web, and singularly constructed for that purpose. The intention of this process is to cleanse the substance from all thick and heterogeneous particles. When thoroughly cleaned, a little of the oil named Toi, expressed from the fruit of the tree kiri, is mixed with it. It is then
put

put into wooden vessels, and carried through Japan to be sold. Both species of varnish, that of Japan and that of Siam, emit a poisonous exhalation, which swells the lips, and gives the head-ach; for which reason the artificers in putting it on, bind their mouth and nostrils with a napkin.— See Kæmpfer's *Amœnitates Exoticæ*, p. 791.

Spurious Varnish-Tree, the *Arbor vernicifera spuria sylvestris angustifolia* of Kæmpfer, the *Rhus succedanea* of Linnæus, grows naturally in China and Japan, and is distinguished from the true varnish-tree, which it greatly resembles, chiefly by the narrowness of the pinnæ of the leaves, and by the size of the fruit, which is as large as a cherry; whilst in the true varnish-tree, the pinnæ are broader, and the fruit, which is altogether white, (another circumstance of discrimination) is about the bigness only of a pea. The true varnish-tree, observes Kæmpfer, is said to be changed into this wild or spurious kind, if planted in a barren spot, and its culture neglected. He adds, that he has seen some plants, the leaves of which fluctuated so remarkably betwixt both sorts, that even the natives were at a loss whether they should, or should not, be reckoned of the true kind. This tree emits its varnish so very sparingly, that it is scarce worth while to collect it. The fruit of both species of varnish tree, the true and the spurious, being beat and boiled, together with the berries of the sanders-tree, and put hot under a press, leave a juice which the Japanese employ in making candles, as they do likewise what is expressed from the berries of two species of laurel, termed by them Taab and Tfun. Kæmpferi *Amœnitat. Exot.* 794.

From the handling, or even breathing in the atmosphere of other poisonous species of sumach, effects equally unpleasant are produced as those described above. The exhalations, in particular, of *Rhus radicans* and *Toxicodendrum*, which, by the way, have no great resemblance to the sumachs, the leaves not being pinnated, but growing by threes, as in trefoil, (*ternata*,) are said to occasion small red spots on the skin, not unlike those eruptions vulgarly known by the name of St. Anthony's Fire. The slightest touch of the leaves produces

produces very violent itchings, which are sometimes followed by an inflammation and swelling. If the juice of any species of poison-tree is suffered to remain but for a few minutes on the skin, it occasions pustules, which are sometimes mistaken for the itch. The wood when burnt, emits a very noxious fume, which is said to suffocate animals that are exposed to it. When exposed to the heat of the sun, the juice becomes so resinous and clammy, that it proves a good bird-lime, and is used with great success for that purpose. A cataplasm of the newly extracted juice of a species of poison-tree, mentioned by Hughes in his Natural History of Barbadoes, applied to the feet, is said to kill the vermin, called by the West-Indians chigers.

The Americans, it is said, pretend to distinguish the poison-ash, (*Rhus Vernix*) by the touch in the dark, from its extreme coldness.

From the *Rhus Copallinum* of Linnæus, the *Rhus Virginianum lentisci foliis* of Ray, is produced Guin Copal, an excellent balsam, equal in goodness to that of Peru. The animals which are wounded by hunters in Louisiana, Florida, and Virginia, cure themselves, we are told, by rubbing against the tree from which this balsam exudes, attracted thereto, probably, by its pleasing aromatic smell.

The Natives of Louisiana and Florida toast the small leaves of *Prinos glaber*, termed by Catesby the true Cassine or Cassena, as we do coffee, and drink the infusion of them with much ceremony. This the Indians call the Liquor of Valour. It is an excellent diuretic; but when taken in great quantity, or made too strong, which, from their attachment to this beverage, is frequently the case, excites a kind of convulsions, which are not productive, however, of any serious inconvenience.

The bark, leaves, flowers and berries of the common elder are used in medicine. An infusion of the inner bark in milk, wine, or water, is a gentle purgative; the leaves, which are of a bitter taste, are outwardly applied in fomentations for the piles. The flowers infused in whey are beneficial in disorders of the skin, and afford a vinegar, which

is less hurtful to the stomach than common vinegar. From the berries, besides a rob and extract, are prepared a spirit, a wine, and an oil, which promote urine, perspiration, and sweat. The whole plant has a disagreeable and almost nauseous smell. The leaves and stalks are so bitter, that few animals will brouze upon them.

The juice of the dwarf elder, the *sambucus ebulus* of botanists, is recommended in dropical cases. The root is bitter, somewhat acrid and nauseous; the inner bark of the root is strongly purgative; the pith, or internal substance, is more astringent than the rest of the plant; the berries and seeds are a gentle purge. The whole plant exhales a strong and disagreeable odour; and is, on that account, frequently placed round granaries, to drive away rats and other vermin.

The ever-green cassine, otherwise called Paraguay, or South-sea tea, Linnæus has confounded with the Carolina or Dahoon holly; though they are undoubtedly distinct plants.

This species of cassine, which grows naturally in Carolina and Virginia, is called yapon by the natives of those countries. The berries are of a beautiful red colour, and as they continue most part of the winter upon the plants without being touched by the birds, we may reasonably conclude that they are possessed of a poisonous quality, as few of the wholesome innocent fruits escape their depredations. The Indians, however, have a great veneration for this plant, and come in great numbers, at certain times of the year, to fetch away the leaves. On such occasions, their usual custom, says Miller, is to make a fire upon the ground, and putting on it a great kettle full of water, they throw in a large quantity of yapon leaves; and, when the water has boiled sufficiently, they drink large draughts of the decoction out of the kettle, which seldom fails to act as a powerful emetic. In this manner, notwithstanding, they continue drinking and vomiting for the space of three days, until they have sufficiently cleansed themselves; they then gather every one a bundle of the shrub, and carry it home with them.

In the operation of these leaves by vomiting, say those who

who have tasted of them, there is no uneasy sensation or pain. The matter discharged comes away in a full stream from the mouth without any violence, or so much as disposing the patient, if he may be called so, to retch, or decline his head. The Spaniards who live near the gold mines in Peru, are frequently obliged to drink an infusion of the herb paraguay, which is generally supposed to be the evergreen cassine, in order to moisten their breast. Without this relief, they are liable to a sort of suffocation, from the strong metallic exhalations which are continually proceeding from the mines.

In Paraguay, the Jesuits make a great revenue of the leaves of a plant, which most authors believe to be the evergreen cassine, called yapon by the North Americans. These leaves are imported into many countries by the name of Paraguay or South-sea tea, and are drunk in infusion, as the leaves of the China and Japan tea; and hence the evergreen cassine is generally known with us, by the name of the South-sea or Paraguay tea.

DUPLICATI. The name of a class in Linnæus's *Methodus Calycina*, consisting of plants which have a double *perianthium*. The class is exemplified in mallow, and most of the plants of that tribe or family; as lavatera, bastard mallow, cotton, Syrian mallow, hollyhock, marsh-mallow, and Indian mallow (*Urena*). These plants make part of the class *Monadelphica* in the Sexual Method, and of the Natural Order, *Columniferae*, which see.

DUPLICATUS fls. (from *duplex*, double) having the corolla doubled, or, in other words, two series or rows of petals. The term is expressive of the least degree of plenitude or luxuriance of which the petals are susceptible, and is exemplified in campanula with a nettle leaf, and thorn apple with a violet flower.

This simplest stage of luxuriance is very common in flowers with one petal.

DURATIO, Duration.

The division of vegetables into trees, and perennial and annual herbs, is founded on the different duration of these plants.

plants. Trees subsist for several years, both by the root and stem: perennial herbs lose their stems during the winter, and are renewed by the root in the following spring: annuals perform the changes of vegetation but once, and are perpetuated in the seed. Striking as these differences are, Linnæus thinks the duration of plants so fallacious, that he never employs it as a specific difference. The reason he assigns is very pertinent. The duration of plants, says he, is frequently affected by place or climate, and therefore ought not to be regarded as an invariable circumstance proper for discriminating the species. In the warmer climates, which enjoy a perpetual summer, most of the plants are perennial, and of the tree kind; yet many of them, when removed to our colder European climates, lose their woody texture, and become herbaceous and frequently annual. Of this the ricinus, or tree palma christi, and marvel of Peru, are familiar instances.

Indian cress, beet, sweet marjoram, and tree-mallow, which, with us, are annual, become, in very warm regions, perennial and shrubby.

E.

EFFLORESCENTIA (from *effloresco*, to bloom); a term expressive of the precise time of the year and month in which every plant shews its first flowers.

Some plants flower twice a year, as is common between the tropics; others oftener, as the monthly rose. The former are called by botanists, *biferæ*; the latter, *multiferæ*. The etymology of each is evident.

The time of flowering is determined by the degree of heat which each species requires; inczeleon and snow-drop produce their flowers in February; primrose in the beginning of March; the greater number of plants during the month of May; corn, and other grain, in the beginning of June; the vine, in the middle of the same month; several compound flowers, in the months of July and August; lastly,

meadow-saffron flowers in the month of October, and announces the speedy approach of winter.

Grass of Parnassus always flowers about the time of cutting down the hay; and in Sweden, the different species of thistle, mountain-lettuce, succory, and balsam, seldom flower till after the summer solstice. The country-men even know, as by a calendar, that the solstice is past, when these plants begin to produce their flowers.

The temperature of the seasons has a mighty influence, both in accelerating and retarding the flowering of plants. All plants are earlier in warm countries: hence such as are cultivated out of their native soil never flower, till the heat of the climate or situation into which they are removed, is equal to that under the influence of which they produced flowers in their own country. For this reason, all exotics from warm climates are later in this country than many plants which it naturally produces.

In general, we may observe, that the plants of the coldest countries, and those produced on the mountains in all climates, being of equal temperature, flower about the same time: to wit, during our spring in Europe.

Plants that grow betwixt the tropics, and those of temperate climates, flower during our summer.

Plants of temperate climates situated under the same parallel of latitude with certain parts of Europe, but removed much farther to the West, such as Canada, Virginia, and the Mississippi, do not produce flowers till autumn.

Plants of temperate climates in the opposite hemisphere to Europe, flower during our winter, which is the summer of those regions.

Linnaeus, and after him Adanson, have each given a sketch of a table of the different times in which the most common plants produce flowers at Upsal and Paris. Such tables, or flower-calendars, however, are very uncertain, and, to be useful, ought to be constructed after the most exact observations. The temperature of the season, as we mentioned above, sometimes retards, sometimes accelerates the flowering of plants; not to mention that annual plants

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flower late or early, according to the time in which the seeds have been sown; and that perennials, for the first year, are liable to the same variations.

ENNEANDRIA, (from ἐννέα, nine, and ἀνὴρ, a man or husband); the name of the ninth class in Linnæus's Sexual System, consisting of plants which have hermaphrodite flowers with nine stamina or male organs.

The orders, or secondary divisions, in this class are three, being founded on the number of the styles, seed-buds, or female organs. Laurus, tinus, and cassytha, have one style; rhubarb (*Rheum*,) has a triple stigma or summit, but scarce any style; flowering-rush has six styles.

The genera just enumerated are all that belong to the class *Enneandria*. The first genus, *laurus*, is very extensive; comprehending the bay-tree, cinnamon-tree, camphire-tree, benjamin-tree, saffrafras-tree, and the avocado or avogato pear.

ENSATÆ (from *ensis*, a sword); the name of the sixth order in Linnæus's Fragments of a Natural Method, consisting of plants with sword-shaped leaves.

List of the Genera contained in this Natural Order.

Linnæan Genera.

English Names.

<i>Antholyza.</i>			
<i>Callisia.</i>			
<i>Commelina.</i>	—		
<i>Crocus,</i>	—	—	Saffron.
<i>Eriocaulon.</i>			
<i>Ferraria.</i>			
<i>Gladiolus,</i>	—	—	Corn-flag.
<i>Iris,</i>	—	—	Iris, or Flower-de-luce.
<i>Ixia.</i>			
<i>Moræa.</i>			
<i>Pontederia.</i>			
<i>Sisyrinchium.</i>			

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Linnæan Genera.	English Names.
<i>Tradescantia</i> , —	— Virginian Spider-wort, or Flower of a Day.
<i>Wachendorfia</i> .	
<i>Xyris</i> .	

Habit and Structure of the Plants of this Order.

This order, which is very nearly allied to the grasses and liliaceous plants, furnishes a very beautiful collection of perennial herbs, which are of different heights, from one inch to fifteen feet. A species of commelina is annual.

The **ROOTS**, are tuberous, or fleshy, and garnished with fibres; those of crocus, and two species of iris, called by Linnæus *Iris Xiphium* and *Sisyrinchium* from genera of Tournefort of the same name, are bulbous. The roots of the last species consist of two bulbs.

The **STEMS** or stalks are simple, and commonly flat, or compressed on the sides. Crocus has no stem above ground; the flowers being produced immediately from the root.

The **LEAVES** are simple, alternate, entire, sword-shaped, and, like the liliaceous plants, form at their origin a sheath or glove, which, in the greatest number, is cleft through the whole length, except at the base, where it is entire, and embraces the stem like a ring.

In Virginian spider-wort, wachendorfia, pontederia, and sisyrinchium, the sheath of the leaves is totally cleft. The leaves of tuberous iris and crocus are not sword-shaped, but formed like a prism with four prominent angles. Those of bulbous iris, Virginian spider-wort, and iris with a double bulb, are semi-cylindrical. The leaves of commelina are of an oval form.

The **FLOWERS** are hermaphrodite, and generally proceed from the summit of the stalks, either singly, as in iris; in an umbel, as crocus, Virginian spider-wort, and commelina; in a spike, as *Sisyrinchium*; in a *Corymbus*, as in *Ixia*; or in a panicle, that is, loose spike, as in wachendorfia. In *Pontederia*, they proceed from the angles of the leaves, either

ther singly, or in an umbel. *Vide* UMBELLA, SPICA, CORYMBUS and PANICULA.

Most of these plants want the *Perianthium*. The flowers burst from a common cover or sheath termed by Linnæus, SPATHA, which, in this order, is frequently permanent. Virginian spider-wort and callisia, have a flower-cup of three leaves. *Eriocaulon* has a common calyx consisting of scales laid over one another like tiles. The calyx in *Xyris* is husky, like that of the grasses.

The PETALS are in number from one to six ; in *ericaulon*, the calyx and petals are placed under the seed-bud. The several species of *commelina* differ exceedingly in the number of their petals : some have two green, and four coloured petals ; some four green, and but two coloured. In many species of iris, the base of the outer petals, that are rolled back, is adorned with a fine soft downy beard, which, in some other species, is supplied by three melliferous points situated externally at the base of the flower.

Commelina has three cross-shaped bodies in the middle of the flower resembling the stamina, but placed above them.

In *Wachendorfia*, the *nectarium* consists of two hairs or bristly appearances, which are placed on the inside of the upper or higher petal.

The STAMINA are generally three in number. Virginian spider-wort, and *ponederia*, have six stamina. The filaments in *ericaulon*, *silyrinchium*, and *ferraria*, are placed upon the style and seed-bud ; in Virginian spider-wort, they are covered with a fine beautiful down.

The SEED-BUD is sometimes placed above the flower, as in *ericaulon*, *wachendorfia*, *callisia*, and *commelina* ; sometimes below it, as in iris, corn flag, *ixia*, and *crocus*.

The STYLE is generally single, and crowned with a triple stigma. *Eriocaulon* has three slender styles.

The STIGMA in iris is very singular, being large and expanded into three leafy parts, that in colour and figure resemble the petals, within which they are placed. This triple stigma is broad, rolled backwards, and parted in two at the top of each leaf or division.

In crocus, the stigma is sawed on the edges, and twisted into a spiral form.

The SEED-VESSEL is a dry capsule, generally of an oblong shape, and opens at three valves discovering the same number of cells, each inclosing a quantity of roundish seeds.

These plants resemble the liliaceous in their powers and sensible qualities; very few of them, however, are used in medicine.

The root of the white florentine iris, commonly called florentine orrice, is described by Lemery as pectoral. Outwardly it is used as sweet powder for the hair. The dyers, perfumers, and confectioners, employ this root in their several professions, to give a grateful scent to their cloaths, perfumes, comfits, and the like.

Of the common iris is made a green colour or pigment much used by the painters in miniature.

The roots of most of the species of *ixia* are eaten by the inhabitants at the Cape of Good Hope, who reckon them very delicate food.

The flower of the Virginian spider-wort is of very short duration: hence the plant was named by Tournefort, *Ephemerum*, or the flower of a day.

Saffron is the chives or stamina of the *crocus sativus*. In Hungary and Poland they eat it as a cordial, sometimes an ounce or more at a time; but taken in great quantities with us, whether medicinally or for pleasure, it produces convulsions, delirium, and even death.

EPIDERMIS. The scarf-skin, or outer covering of the bark of plants.

EPIPHYLLOSPERMÆ, (from *ἐπι*, upon, *φυλλον*, a leaf, and *σπερμα*, a seed.) The name of a class in Haller's Natural Method, consisting of plants which bear their seeds on the back of the leaf. This class comprehends all the ferns. *Vide* FILICES.

ERECTUS *flos*, an erect flower, in opposition to a nodding, or drooping one.

ERISTICI, (from *ἐρίς*, strife) polemical or controversial

flial botanists so termed by Linnæus; such were Tournefort, Colet, and Chomel; Ray and Rivinus; Dillenius and Rivinus; Linnæus and Sigelbeck.

ESSENTIALIS *character*. Vide CHARACTERES.

EUNUCHI, eunuchs. Full flowers so called, which, by multiplying the petals, exclude the stamina or male organs of generation altogether, and thus render the seed barren. Vide LUXURIANS and PLENUS *flos*.

F.

FACIES *Externa*, the port or habit of plants. Vide HABITUS and CHARACTERES.

FACTITIUS *Character*. Vide CHARACTERES.

FASCIATA *planta* (from *fascis*, a bundle) plants so called, which consist of several stems or stalks growing close together so as to form a compact bundle.

FASCICULUS (a diminutive from *fascis*, a bundle) a little bundle; a mode of flowering, in which the flower-stalks are erect, parallel, placed close to one another, and raised to the same height; as in sweet-william.

FAUX, the jaws or chaps. The gaping at the top of the tube of a monopetalous flower. Vide COROLLA.

FEMINEUS *flos*, a female flower. By this name Linnæus and the Sexualists denominate a flower which is furnished with the pistillum or female organ of generation, but wants the stamina or male organ.

Female flowers may be produced apart from the male, either on the same root, or on distinct plants. Birch and mulberry are examples of the first case; willow and poplar of the second. Male and female flowers separated on the same plant, constitute the class *Monœcia* of Linnæus; separated on distinct roots, the class *Diœcia*. Vide MONŒCIA & DIŒCIA.

FEMINA *planta*, a female plant, a plant which bears female flowers only; opposed to a male plant, which produces only

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male flowers, and to an androgynous one, which bears flowers that are of both sexes. *Vide supra.*

Female plants are produced from the same seed with the male, and arrange themselves under the class *Diœcia* in the Sexual Method.

FIGURA, Figure; a property of natural bodies, from which marks and distinctive characters are frequently drawn. *Vide CHARACTERES.* Figure is more constant than number, more variable than proportion and situation.

The figure of the flower in the same species is more constant than that of the fruit: hence Linnæus advises to arrange under the same genus, such plants as agree invariably in the flower, that is, in the calyx, petals and stamina, although the fruit or seed-vessel should be very different. The seed-vessels of the different species of French honey-suckle, wild senna, acacia, Syrian mallow, and sophora, are exceedingly diversified in point of figure. Hence some former botanists, who paid more attention to the parts of the fruit, considered many of these species as distinct genera, and denominated them accordingly.

The figure of the seed-vessel is a very common specific difference in the Sexual Method.

FILAMENTUM, (from *filum*, a thread) the lower, slender, or thread-shaped part of the stamina, that serves as a foot-stalk for elevating the *anthers*, and connecting them with the vegetable. The term is equivalent to the *stamen* of Tournefort and other botanists. With Linnæus, *stamen* is a general term, the two parts of which are, the filament or thread, and the *anthera* or summit. *Vide STAMEN & ANTHERA.*

From the number of the filaments the first thirteen classes in the Sexual Method arise: it is, therefore, unnecessary to enlarge upon that circumstance in this place.

With respect to figure, filaments are either slender like a hair, as in plantain; flat, as in star of Bethlehem; wedge-shaped, as in meadow-rue; twisted like a screw, as in hirtella; awl-shaped, as in tulip: notched, as in many of the
lip.

lip-flowers; or bent backwards, as in superb lily. The filaments in spider-wort and flower-of-a-day are beautifully covered with a fine hairy down.

With respect to proportion, the filaments are either very long, as in plantain; very short, as in arrow-headed grass; of equal lengths, as in most flowers; or irregular and unequal, as in the lip and cross-shaped flowers, which, from this circumstance, constitute the classes *Didynamia* and *Tetradynamia* in Linnæus's Method.

The situation of the filaments is generally opposite to the divisions of the calyx, and alternate with the petals. In elæagnus, and other flowers which want one of the covers, the filaments are placed alternate with the divisions of the remaining cover: whence I should be inclined to imagine that such flowers want the calyx, not the petals, as Linnæus asserts. In general it may be affirmed, that when the divisions of the calyx are equal in number to the petals and stamina, the petals are alternate with the stamina and flower-cup: the stamina are placed opposite to the divisions of the calyx, and to the valves or inclosures of the fruit, when these correspond in number, as sometimes happens in the natural order Caryophyllei; and all the parts in question are attached to the receptacle of the flowers. Again, if the stamina, in plants which have neither calyx nor petals, are equal in number, and opposite to the valves or inclosures of the fruit, we may reasonably conclude that they are placed upon the receptacle, as in the last case. But if, on the other hand, they are alternate with the valves, the inference is, that they are attached, like the plants of the class *Icosandria*, to the calyx.

In flowers that consist of one petal, the stamina are generally inserted into its base. For this observation, we are indebted to the minute and accurate researches of Vaillant and Pontedera, particularly the last, who is said to have dissected the flowers of two thousand species of plants, with a view to establish a general rule with respect to the insertion of the filaments of the stamina. By attending to the rule just mentioned, we can determine with exactness, in doubt-

ful cases, whether the flower consists of one or more petals. It is in this manner we pronounce with certainty the flowers of wood-forrel, and winter-green (*trientalis*) to consist of only one petal, although the divisions cohere so slightly at the base as to be easily mistaken for distinct leaves.

There are, however, some examples of flowers with one petal that have the stamina attached to the receptacle; such are heath, American upright honey-suckle, and some other plants which belong to the natural order *Bicornes*. The same may be said of the stamina of cissus, aloe and acacia.

In flowers that consist of more petals than one, the stamina are generally distinct from the petals; being attached either to the calyx, as in the class *Icosandria* of Linnæus, and the natural orders *Calycanthemæ* and *Calycifloræ*; or to the receptacle, as in the greater number. This rule, however, as well as the foregoing, admits of exceptions. In sea-pink, the filaments of the stamina are inserted into the claws of the petals, which are five in number. The same appearance is observed in star-wort, which consists of six distinct petals; and in most of the plants of the natural order *Caryophyllei*, the stamina are attached alternately to the claws of the petals and the receptacle.

A striking exception to the general rule has not yet been mentioned. In some plants, as birth-wort and orchis, the stamina are inserted, neither into the calyx, petals, nor receptacle, but into the pointal, or female organ of generation. Upon this singular circumstance is founded the class *Gynandria* in the Sexual Method, which, however, contains many more genera than in strict propriety pertain to it; as passion-flower, grevia, and screw-tree; which have no characteristic mark of this kind.

In assimilating the animal and vegetable kingdoms, Linnæus distinguishes the filaments by the name of the spermatic vessels.

FILICES, (from *filum*, a thread,) ferns, one of the seven families or natural tribes into which the whole vegetable kingdom is divided by Linnæus in his *Philosophia Botanica*. They are defined to be plants which bear their flower and fruit

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on the back of the leaf or stalk, which, in this class of imperfect plants, are the same. *Vide FRONS.*

In the Sexual System, the ferns constitute the first order or secondary division of the twenty-fourth class, *Cryptogamia*: in Tournefort's Method they are the sixteenth class; and in Ray's the fourth under the name of *Capillares*. Haller denominates them *Epiphyllispermæ*, that is, plants that bear their seed on the back of the leaf; others term them *Acaules*, because they have properly no stem.

FILICES is likewise the name of the fifty-fifth order in Linnæus's Fragments of a Natural Method, consisting of plants, which, among others, have the general character just mentioned.

List of the Genera contained in this Natural Order.

S E C T I O N I.

Ferns, in which the Parts of Fruetification grow upon the Leaves.

Linnæan Genera.		English Names.
<i>Acrostichum.</i>		
<i>Adiantum,</i>	—	— Maiden-hair.
<i>Asplenium,</i>	—	— Spleen-wort, or milt-waste.
<i>Blechnum.</i>		
<i>Hemionitis,</i>	—	— Mules-fern.
<i>Isoetes.</i>		
<i>Lonchitis,</i>	—	— Rough spleen-wort.
<i>Polypodium,</i>	—	— Polypody.
<i>Pteris,</i>	—	— Brakes, or female fern.
<i>Trichomanes.</i>		

S E C T I O N II.

Ferns, in which the Flowers are borne upon Foot-stalks that over-top the Leaves.

Marfilea.

Onoclea.

Ophioglossum,

Linnæan Genera.	English Names.
<i>Ophioglossum</i> , —	Adder's-tongue.
<i>Osmunda</i> , —	Osmund-royal, or flowering-fern.
<i>Pilularia</i> , —	Pepper-grafs.

Habit and Structure of the Plants of this Natural Order.

These plants, in figure, approach the more perfect vegetables, being furnished, like them, with roots and leaves.

The **ROOTS** creep, and extend themselves horizontally under the earth, throwing out a number of very slender fibres on all sides.

The **STEM** in these plants is not to be distinguished from the common foot-stalk, or rather middle rib, of the leaves: so that, in strict propriety, the greater number of ferns may be said to be *acaules*, that is, to want the stem altogether: in plants of the second section, however, the middle rib, or a stalk proceeding from the root, overtops the leaves, and forms a stem, upon which the flowers are supported.

The **LEAVES** proceed either singly, or in greater numbers, from the extremities of the branches of the main root. They are winged, or hand-shaped, in all the genera, except in adder's-tongue, pepper-grafs, and some species of spleenwort.

The **FLOWERS** of the ferns, whatever be their nature, are, in the greater number of genera, fastened, and, as it were, glued to the back of the leaves; in some, they are supported upon a stem or stalk, which rises above the leaves, and is either, as we said above, a prolongation of their middle rib, or issues out of the centre of the plant, unconnected with the leaves altogether. From these different modes of flowering, arise the two sections, or divisions of this Natural Order.

The **STAMINA** are placed apart from the seed-bud, or female organ, in a genus termed by Adanson, *palma-filix*: in the other ferns, where we have been able to discover the stamina, they are found within the same covers with the seed-

seed-bud. This principal part of the flower, however, has not been accurately or satisfactorily traced, except in a very few genera, the chief of which are *isoetes*, pepper-grafs, and *marfilea*. M. de Jussieu, who first discovered the flowers of the two last genera, observes, in his Memoir on this subject, delivered to the Royal Academy of Sciences, in 1739, that their stamina are *anthers*, or tops without filaments; that they are top-shaped, and open above by a transverse or broad furrow. They have only a single cavity, from which issues a fine dust, composed of simple, hard globules, which do not open when put into water, as those of perfect plants.

M. Maratti, in 1760, employed his enquiries upon the stamina of these imperfect plants, and is said to have traced them in a great many genera. His discoveries, however, on this subject, have not been generally received as authentic.

With respect to what are vulgarly called the seeds of ferns, we have not yet been able to determine, with any degree of precision, whether they are indeed seeds, or of the nature of stamina. M. de Jussieu inclines to the latter opinion.

The Canadian fern bears at the origin of each division of the leaves a number of berries, which being sown, produce new plants in the same manner as other seeds. In the Pyrenæan Mountains is produced a small species of annual fern, which sows itself every year, and is termed by Tournefort, *flicula montana folio vario*. M. de Jussieu is of opinion, that a strict attention to this plant might alone accurately decide the question, which has been so long agitated among botanists; not whether the ferns are furnished with seeds, (for that few people are now disposed to call in question); but of what nature these seeds are, and where placed; whether the stamina are separate from the female parts, on the same, or on different roots; or, whether these parts are mingled together under the same cover, or in the same heap or bundle of flowers, as some observations of Dillenius would lead us to imagine.

In short, all our researches upon this subject are mere conjecture; and men knew much more of these imperfect plants,

plants, who never suspected they were furnished with stamina or seeds, than the moderns, who confining their enquiries to those minute parts which generally elude the sight, have entirely neglected their port or habit; although that only can furnish accurate distinctive characters in this natural tribe or family of plants.

Most of the ferns have a heavy, disagreeable smell; they are opening, and attenuating.

The true maiden-hair, or Capillaire of Montpellier, a well-known medicine, is the *adiantum foliis coriandri* of Caspar Bauhin, the *capillus veneris verus* of Gerard, the *adiantum capillus veneris* of Linnæus. It is a plant which grows in France, Italy, and the Levant, upon old moist walls, in wells, fountains, and the clefts of rocks. The leaves, which are almost triangular, have a fragrant smell, and an agreeable taste, though slightly astringent and bitter. They are much used in the countries which produce the plant in syrups, and in opening and diuretic decoctions.

Black maiden-hair, or oak fern, the *adiantum pulcherimum* of Bauhin, the *Asplenium adiantum nigrum* of Linnæus, is produced naturally in most parts of England upon old walls, and in shady places, at the roots of trees and shrubs. The pedicles are black, and the pollen or dust upon the back of the leaves is of the colour of saffron.

As there has been no small confusion in distinguishing the several species of maiden-hair used in medicine; and as some, ignorant in botany, have erroneously substituted in their place, the leaves of Polypody and Hart's tongue, which they do not, however, much resemble, and even the root of the former; I thought it would not be improper in this place to observe, that the genuine species of Capillaire are reduced to six: that of Montpellier, or *adiantum Capillus Veneris*; the black which has just been described; the *Trichomanes*, or English black, generally used with us for the first sort; the true white, or *ruta muraria*; Ceterach of the shops, and *adiantum pedatum*, which grows naturally in Canada and Virginia. All the sorts, except the first and last, rank under the genus *Asplenium*.

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The Canada maiden-hair approaches nearest in quality to that of Montpellier. The traders, we are told, pack up their goods with it instead of hay, when they are sent into distant countries, as France and England; a circumstance which renders this fern so very common in Europe.

Ceterach, or common spleen-wort, just mentioned, which, like other species of the same genus, grows naturally on old walls, churches, and clefts of moist rocks, is termed by the natives of Languedoc, where it is produced in great abundance, golden locks, because of its great resemblance to hair, and its golden colour. It is pectoral, aperient, and particularly adapted for diseases of the spleen.

The plants of the polypody kind strike their roots into whatever they can lay hold of, whether stone, earth or tree. They were formerly believed to be particularly attached to oak-trees; but this is a mistake, as they are found much more frequently on other trees. Polypody is prescribed in medicine, and esteemed a gentle purgative.

Ophioglossum has only one leaf, from the middle of which proceed one or two spikes of flowers resembling a serpent's tongue; from which fancied similitude this genus of plants has derived its name in both languages. The plant is vulnerary, particularly the leaves, when infused in oil of olives.

The root of the female fern, a species of *pteris*, has a bitter astringent taste, and enters into the composition of fern-stone, a very powerful astringent. In England, the ashes of fern kneaded in water, have been successfully used in bleaching linen, and supplying the place of soap. The trivial name *aquilina*, which Linnæus gives to this species of *filix*, is derived from the figure of a transverse section of the root, which is said to resemble the Roman eagle.

Royal osinund, a species of flowering fern, is less bitter and astringent than the other ferns; the pith of the root is white, vulnerary, and used in decoction, as are likewise the bunches or clusters of flowers.

FLORESCENTIA (from *floresco*, to flourish or bloom). The act of flowering, which Linnæus and the Sexualists compare

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compare to the act of generation in animals ; as the ripening of the fruit, in their judgment, resembles the birth. *Vide* FLOS.

FLORIBUNDI (from *florere*, to bloom.) The name of the seventh class in Linnæus's Method founded on the calyx, consisting of plants that have a simple perianthium, into which are inserted the petals and stamina. This class comprehends the *icosandria* of the Sexual Method, and the two natural orders, *Calycanthemæ* and *Calycifloræ*, which see.

FLORISTÆ, from *Flora*. By this name Linnæus terms a class of botanical writers, who enumerate the indigenous or native vegetables of any particular place or country. The most eminent of these enumerations, or, as they are commonly called, Floras, are Ray's and Hudson's *flora anglica* ; Linnæus's *flora suecica* and *lapponica* ; Haller's, *helvetica* ; Magnolius's, *monspeliaca* ; Gmelin's, *sibirica* ; Vaillant's, *parisina* ; Ruppius's, *jensenfis* ; and Hill's *flora britannica*.

These floras are arranged according to some approved system, as Hudson's after that of Linnæus, and contain the generic and specific differences of whatever method they adopt. They are useful in conducting to the knowledge of the curious plants in one's country ; as they instruct both in the place of growth, the nature of the soil, the time of flowering, and the duration of any particular plant in question.

FLOS. The flower: by this term, former botanists, as Columna, Jungius, Ray, and Tournefort, evidently meant the petals, or beautiful coloured leaves of the plant, which generally adhere to the seed-bud, or rudiment of the fruit. *Vide* ANTHUS.

Since the introduction of the Sexual Method, the petals have lost their importance, and are now only considered as a finer sort of cover, which is generally present, but not essentially necessary to the existence of a flower.

A flower then, in modern botany, is as different in meaning from the same term in former writers, as from the vulgar acceptations of the word at this day. The petals, the calyx,
nay,

may, the threads or filaments of the stamina may all be wanting; yet it is a flower still, provided the anthers or male organ, and the stigma or summit of the style, the female organ, can be traced, and that either immediately in the neighbourhood of one another, as in most plants; on different parts of the same plant, as in the class *Monœcia*; or on different plants, raised from the same seed, as in the class *Diœcia*. In this manner is to be understood the general principle with which the Sexual Method sets out, that every vegetable is furnished with flower and fruit. The essence of the flower, as the author immediately subjoins, consists in the *anthers* and *stigma*, which constitute a flower, whether the covers, that is, the calyx and petals, are present or not. *Vide* Principles of the Sexual Method, under the article ANTHERA.

The general principle just mentioned is extended by Linnæus to those plants vulgarly called imperfect; I mean the ferns, mosses, mushrooms, lichens and sea weed; in most of which we have not been able to discover any thing resembling flower or fruit. As, however, in a few genera, something like stamina and seeds, have been discovered; it is probable that they are all furnished with similar parts, although their minuteness, or their situation within the plant, may prevent us from discovering them, either by the naked eye, or with the assistance of glasses.

The flowers of pepper-grass and marsilea, two of the fern tribe, were discovered by B. Jussieu, in 1739; those of isoetes by Linnæus; the stamina of the fuci, a numerous tribe of sea-weed, were discovered by Reaumur, in 1711; whose observations on this curious subject were confirmed by Grisebini, in 1750. Micheli, in 1729, discovered, as he imagined, the stamina of the mushrooms. The calyx, petals, stamina and pointal are properly parts of the flower; the remaining parts of the fructification pertaining only to the fruit.

FLOSCULOSI. The name of the twelfth class in Tournefort's Method, consisting of compound flowers which are composed entirely of florets with hollow funnel-shaped
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petals,

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petals. The term is exemplified in burdock, thistle, artichoke, blue-bottle, and cudweed. To this class Tournefort has added scabious, teasel, and some others, which resemble the compound flowers in being contained within a common calyx.

Most of the plants in this class belong to the two first orders in the class *Syngenesia* of the Sexual Method. *Vide* SYNGENESIA.

FLOSCULUS. A partial or lesser floret of an aggregate flower. *Vide* AGGREGATUS *flos*.

FOLIATIO, (from *folium*, a leaf.) The curious manner in which the leaves are wrapped or folded up in the buds. This term in the latter editions of Linnæus's works is changed for **VERNATIO**, which see.

FOLIOLA. The lesser leaves or lobes, which, together, constitute a compound leaf. *Vide infra*.

FOLIUM. A leaf, defined to be a part of a plant extended into length and breadth in such a manner, as to have one side distinguishable from the other. This is Miller's definition; and is certainly more intelligible than that of Linnæus, which denominates leaves the organs of motion, or muscles of the plant.

The leaves are not merely ornamental to plants; they serve very useful purposes, and make part of the organs of vegetation.

The greater number of plants, particularly trees, are furnished with leaves: in mushrooms, and shrubby horse-tail, they are totally wanting. Ludwig defines leaves to be fibrous and cellular processes of the plant, which are of various figures, but generally extended into a plain, membranaceous or skinny substance. They are of a deeper green than the foot-stalks on which they stand, and are formed by the expansion of the vessels of the stalk, among which, in several leaves, the proper vessels are distinguished by the particular taste, colour, and smell of the liquors contained within them.

By the expansion of the vessels of the stalk are produced several ramifications, which crossing each other mutually,

form

form a kind of net, the meshes or interstices of which are filled up with a tender cellular substance, called the pulp, pith, or parenchyma. This pulpy substance is frequently consumed by certain small insects, whilst the membranous net remaining untouched exhibits the genuine skeleton of the leaf.

The net in question is covered externally with an epidermis or scarf-skin, which appears to be a continuation of the scarf-skin of the stalk, and, perhaps, of that of the stem. M. Defauffure, a judicious naturalist, has attempted to prove that this scarf-skin, like that of the petals, is a true bark, composed itself of an epidermis and cortical net; these parts seem to be the organs of perspiration, which serve to dissipate the superfluous juices.

The cortical net is furnished, principally on the lower surface of the leaf, with a great number of suckers or absorbent vessels, destined to imbibe the humidity of the air. The upper surface, turned towards heaven, serves as a defence to the lower, which looks downward; and this disposition is so essential to the vegetable œconomy, that, if a branch is overturned in such a manner as to destroy the natural direction of the leaves, they will, of themselves, in a very short time, resume their former position; and that as often as the branch is thus overturned.

Leaves then are useful and necessary organs; trees perish, when totally divested of them. In general, plants stripped of any of their leaves, cannot shoot vigorously; witness those which have undergone the depredations of insects; witness, likewise, the very common practice of stripping off some of the leaves from plants, when we would suspend their growth, or diminish the number of their shoots. This method is sometimes observed with corn and the esculent grasses; and, in cold years, is practised on fruit-trees and vines, to render the fruit ripper and better coloured: but in this case it is proper to wait till the fruits have acquired their full bulk, as the leaves contribute greatly to their growth, but hinder, when too numerous, that exquisite rectifying of the

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juices, which is so necessary to render them delicious and palatable.

When vegetation ceases, the organs of perspiration and inspiration become superfluous. Plants, therefore, are not always adorned with leaves: they produce new ones every year; and every year the greater part are totally divested of them, and remain naked during the winter. *Vide FRONDESCENTIA et DEFOLIATIO.*

Having premised these general observations respecting the anatomy and use of the leaves, I proceed to consider the external form and configuration of this useful and ornamental part of the plant; and to particularize the several distinctions which are made by botanical writers on that subject.

Of leaves, some are primary, others accessory; these last are the *stipulae* and *bractea* of Linnæus; the first of which are a set of scales, generally placed at the origin of the young footstalks for support: the latter accompany the flowers, and differ in figure and colour from the proper leaves of the plant. *Vide BRACTEA and STIPULA.*

In viewing the external appearance of leaves with reference to vegetable arrangement, two things occur to be considered:

The FORM of leaves, and their DETERMINATION.

By the *form of leaves*, I understand their structure, and external configuration. By their *determination*, every thing respecting leaves, which does not pertain to their form, but to their disposition on the plant.

Leaves, considered with respect to their form, are divided into simple and compound.

Simple Leaves.

Simple leaves are such whose footstalk is terminated by a single expansion; in other words, whose divisions, however deep, do not reach the middle rib. To understand this, let it be observed, that the middle rib of every leaf is the principal

cial prolongation of the footstalk, which, to form the membranaceous expansion called the leaf, runs out, as was observed above, into a number of ramifications, that inosculating and crossing each other mutually, form the cortical net already described. When these ramifications of the footstalk are so connected as to form one entire expansion, the leaf is said to be simple; but when the middle rib becomes, in fact, a footstalk, and many different expansions, instead of one, proceed from the common footstalk, the leaf is said to be compound. This will be further illustrated below.

Simple leaves are either

Round, *folium orbiculatum*; as in *rumex digynus*.

Egg-shaped, *ovatum*; as in *vaccinium myrtillus*.

Oval or elliptic, *ovale*; as in the rose.

Wedge-shaped, *cuneiforme*; as in *apium graveolens*.

Oblong, *oblongum*, as in sorrel and woolly cerasium.

Lancet-shaped, *lanceolatum*; that is, tapering towards each extremity, as in *plantago lanceolata*.

Equally broad every way, *lineare*; as in rosemary, pine, and the grasses.

Chaffy and ever-green, *acerosum*; as in fir, yew, pine, and cedar-trees.

Awl shaped, *subulatum*; that is, gradually contracting towards the top, as in juniper, *arenaria saxatilis*, and *sedum rupestre*.

Ear shaped, *auriculatum*; that is, furnished with two appendages or ears at the base near the foot-stalk, as in *jungmannia ciliaris*.

Heart-shaped, *cordatum*; as in lime-tree.

Kidney-shaped, *reniforme*; as in asarabacca, sea bind-weed, *campanula rotundifolia*, and *saxifraga granulata*.

Arrow-shaped, *sagittatum*; as in field bind-weed, and common heath.

Halbert or spear-shaped, *hastatum*; as in bitter-sweet; and *scutellaria hastifolia*.

Parted half-way down, *fissum*.

Divided almost to the midrib, *lobatum*.

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From the number of divisions in either case, the leaves are termed *bifida*, *trifida*, *biloba*, *triloba*, &c.

Hand-shaped, *palmatum*; that is, resembling an open palm or hand, a fan, or an umbrella. These leaves have very deep longitudinal divisions extending almost to the base; such are those of *palma christi*, *palmetto* or thatch, some of the ferns, and the true rhubarb, the *rheum palmatum* of Linnæus. The leaves of a species of passion-flower are shaped like the wings of a bat.

With respect to their tip or extremity, simple leaves are,

Stumped, or seem bitten, *truncatum*; as in the tulip-tree.

Terminated with tendrils, *cirrosum*; as in superb lily.

The margin or brim of the leaf runs out into rigid points or thorns (*folium spinosum*) as in holly; or is furnished with horizontal points of the consistence of the leaf (*folium dentatum*) as in dandelion, spring-primrose, and *epilobium montanum*. In *vaccinium myrtillus*, and *arbutus alpina*, it is sawed (*folium serratum*); that is, furnished with teeth, whose points look towards the tip or upper extremity of the leaf. In *primula farinosa*, it is notched (*crenatum*) or cut into small teeth, which are either sharp or round at the points, and do not look to either extremity. In *erica ciliaris*, it is fringed like an eye-lash, (*ciliatum*), or guarded longitudinally by parallel bristles. The upper part of the leaf has commonly a smoother surface than the lower; it is besides of a deeper green, and has its nerves and ramifications generally hollow; whilst the ribs of the lower surface are most commonly prominent. This rule, however, is not universal; some leaves have their ribs prominent above, and hollow below. These leaves are called by botanists, *folia bullata*; that is, blistered leaves. Such are those of many species of sage. Again, the leaves of succulent, bulbous, and several liliaceous plants, have on neither side, the prominent nerves or ribs which are found on almost all the leaves of trees.

With respect to their surface, leaves are,

Cottony, or covered with a beautiful white down, *folium tomentosum*; as in *cerastium tomentosum*, raspberry, and the greater part of plants that grow in the neighbourhood of the sea.

Woolly,

Woolly, or soft like velvet, *lanatum*, as in iron-wort, *ledum villosum*, and some geraniums.

Hairy, *pilosum*; as in *cortusa* and *juncus pilosus*.

Bristly, *hispidum*; as in *turritis hirsuta*.

Rough with knots, *scabrum*; and covered with pimples, *papulosum*; as in several of the fig-marigolds.

Prickly, *aculeatum*; as in some of the thistles.

Covered with transparent points, *punctatum*; as in St. John's wort.

Smooth, *glabrum*; as in bay.

Shining or glittering, *nitidum*; as in Canadian angelica, and some magnolias.

Wrinkled, *rugosum*; as in sage.

Beautifully plaited, *plicatum*; as in lady's mantle.

Rising and falling in convexities towards the margin, *undulatum*; as in *cænotheca mollissima*.

Covered with simple, unbranched prolongations of the footstalk, that extend from the base to the tip, *nervosum*; as in cinnamon, camphire, and some of the plantains.

Covered with veins, or branched vessels, *venosum*; as in *laurus nobilis*, and most plants.

Clammy, *viscidum*; as in *senecio viscosus*.

Beautifully coloured, *coloratum*; as in *amaranthus tricolor*.

Naked, *nudum*; that is, without any kind of hair or pubescence.

Ray, and after him Linnæus, has distinguished a natural family of plants, by the name of *asperifoliæ*; that is, plants whose leaves are rough to the touch.

With respect to their substance, or general port, leaves are, Cylindrical, *teres*; as in *allium vineale*, and *oleraceum*.

Succulent, as in the aloes.

Sword-shaped, as in *iris*.

Shaped like a Persian scymitar, *acinaciforme*; as in some of the fig-marigolds, some of which are likewise hatchet and tongue-shaped.

Two-edged, *anceps*; as in *sisyrrinchium*.

Keel-shaped on the under surface, *carinatum*; as in *crinum asiaticum*.

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Compound Leaves.

Compound leaves are such whose footstalk is terminated by several expansions ; in other words, whose divisions extend to the common footstalk, which not running into the membranaceous part of the leaf, supports the several lobes or lesser leaves, called *foliola*, of which the compound leaf consists.

These *foliola* or lobes are, themselves, small simple leaves, and, like them, vary in their form, according to the distinctions already established. Like them, also, they are sometimes furnished with short footstalks, (*folium petiolatum*) ; sometimes seated upon the middle rib without any proper footstalk, (*folium sessile*.) *Vide infra*.

In compound leaves, the production of the base of the leaf to which the lesser leaves adhere is by botanists called *costa*, the rib. The same term is used for the principal prolongation of the footstalk in simple leaves. This prolongation in each of the lobes of a compound leaf is by some denominated a nerve ; by others, less properly, a vein. The nerve is either most conspicuous in the middle of the leaf, and then it is likewise sometimes called *costa*, the rib ; or it is divided at its entrance into the membranaceous part of the leaf, into two, three, five, seven, or more parts.

As students of botany are frequently at a loss to know compound leaves by sight, and sometimes apt to mistake a common footstalk for a branch, it is proper to observe, that in the angle which they form in issuing from the stems and branches, the footstalks of the leaves are flat, if not hollowed ; so that they present two surfaces, a front and a back ; the former, as we have said, hollow or flat, the latter, convex : whereas, stems and branches are universally alike on both sides, being either both round, both flat, or both angular.

Again, buds are never observed in the angles formed by the lobes of a compound leaf with the foot-stalk : they issue from the angle which the whole leaf makes with the branch or stem. Lastly, the branches in woody plants continue after the

the leaves are fallen. The common footstalk of a compound leaf, however much it may resemble a branch in appearance, may always be certainly distinguished by this circumstance, that it falls off with the leaves which it supports.

Compound leaves are divided into compound properly so called; leaves twice compounded; and leaves more than twice compounded. Each division admits of a variety of modifications, which give rise to as great a variety of terms.

A compound leaf properly so called, *folium compositum*, is only once compounded, and admits of the following varieties.

A finger-shaped leaf, *digitatum*, is properly a modification of a hand-shaped one, with this difference, that the divisions, which resemble fingers, are distinct, and extend to the extremity or top of the footstalk on which they are collected in rays. Lupin, horse-chestnut, Ethiopian sourgourd, and silk cotton-tree, furnish examples. From the number of fingers or leaves thus collected, other terms have been invented. When two, the leaf is termed *binatum*; when three, *ternatum*, from the numerals, two and three, compounded with the Latin verb, signifying to grow. Sometimes too, the fingers in question are seated immediately on the top of the footstalk; sometimes, as in trefoil, each finger is furnished with a small proper footstalk.

A winged or pinnated leaf, *pinnatum*, is composed of a number of smaller leaves arranged like wings along the sides of a common footstalk. In the former species of compound leaves, the lobes are attached to the summit of the footstalk; in this, the common footstalk is prolonged, becomes a kind of middle rib, and receives the lobes on both sides of it. These lobes or lesser leaves are distinct, and have generally small partial footstalks, by which they are attached to the common footstalk or middle rib. The term is commonly appropriated to leguminous plants, as the *acacias* and most of the butterfly-shaped flowers, and admits of considerable varieties.

The lobes of a winged leaf are sometimes opposite, as in sumach; sometimes alternate, as in Greek valerian. Compound

pound winged leaves are frequently terminated by an odd leaf or lobe, which is not attached to the sides, as the other lobes, but stands by itself, and proceeds from the extremity of the middle rib. This mode of winged leaf is exemplified in many of the sumachs; acacias, and ladies finger. Instead of the odd lobe just mentioned, some winged leaves are terminated with tendrils. When neither an odd lobe, nor a tendril terminates a winged leaf, it is called by botanists an abruptly winged leaf, as in *robinia caragana*. In some plants the lobes are of an unequal length, some pairs being larger than others. The leaf in that case is said to be interruptedly winged, and is exemplified in some species of ladies finger. Lastly, a winged leaf sometimes consists of two lobes or lesser leaves only, as in fabago or bean caper, and some of the acacias. This species of winged leaf is termed by botanists *folium conjugatum*.

A recomposed or twice compounded leaf, *folium decompositum*, is that in which the footstalk, instead of supporting lobes or lesser leaves on the top, or on each side, bears partial footstalks, from which proceed the leaves on both sides.

In barren-wort each of the lateral footstalks supports three leaves; this sort of leaf is termed by Linnæus, *biterdatum*, or *duplicato-ternatum*; that is, double-three-leaved. In many acacias, the small leaves are arranged like wings, not around the common footstalk, but on each side of the partial or lateral footstalks proceeding from it; so that this kind of compound leaf is very properly stiled double-winged, (*bipinnatum seu duplicato-pinnatum*).

In some species of passion-flower, and cuckow-pint, the footstalk divides at top into two parts, on the inside of which the lobes or lesser leaves are supported. This species of compound leaf is termed foot-shaped (*pedatum*).

A more than twice compounded leaf, *folium supradecompositum*, is that in which the lateral footstalks, instead of bearing leaves, as in the former case, are subdivided into other partial footstalks, from whence proceed the lobes or lesser leaves; in other words, double-three-leaved, and double-winged-leaves, are here inserted into a common foot-stalk: the leaf, in the first case, being termed triple-three-leaved (*triterdatum seu*

seu triplicato-ternatum); in the second, triple-winged (*tripinnatum seu triplicato-pinnatum*).

Of the Determination or Disposition of Leaves.

The determination of leaves, whether simple or compound, comprehends the four following particulars: the place of the leaf; its insertion; situation; and direction.

By the place of the leaf is meant the particular part where it is attached to the plant.

A flower-leaf, *folium florale*, is placed near the flower, and never appears but with it.

A branch-leaf, *folium rameum*, is seated or placed upon the branch.

A stem-leaf, *folium caulinum*, grows from the stem or stalk of the plant.

An axillary-leaf, *folium axillare*, is that which proceeds from the insertion of the branches: in other words, from their arm-pit, or the angle which they form with the stem.

A bottom, radical, or root-leaf, *folium radicale*, comes immediately from the root, without adhering to the stem.

A seed-leaf, *folium seminale*, proceeds immediately from a seed which has sprouted; and is a production of its *cotyledons* or lobes. *Vide* COTYLEDONES.

By the insertion of a leaf is meant the manner in which it is attached to the plant.

A leaf furnished with a foot-stalk, is termed by Botanists *petiolatum folium*; that which is seated immediately on the stem or branch without any manifest foot-stalk, *folium sessile*, and is exemplified in spiked mint, *teucrium scordium*, and *tormentilla erecta*.

The same name is retained, when the base of the leaf only is left without any membranaceous expansion, as in jujube.

A target shaped leaf, *folium peltatum*, has the footstalk inserted into the center of the lower disk or surface, and not into the base or margin. This singular kind of leaf is exemplified in water lily, *palma Christi*, Indian-crests, jack in a box, and a species of *geranium*, hence named *peltatum*.

This

This species of leaf was formerly termed *umbilicated*, from a small cavity like a navel, that is formed on the upper side, immediately opposite to the insertion of the footstalk.

A running-leaf, *decurrens*, adheres closely to the stalk as if glued to it, from the base to the middle, the upper half remaining detached and free; in other words, this sort of leaf extends itself downwards along the stem, beyond its proper termination. It is exemplified in thistle, *verbascum*, and globe flower.

A leaf is said to embrace the stem, *amplexicaule*, when by its base it entirely surrounds it transversely; as in moth-mullein, and black henbane. These leaves are generally heart and arrow-shaped.

A perforated leaf, *folium perfoliatum*, differs from the former term, in that the perforating stalk or branch does not touch the margin, but approaches the center of the leaf. It is exemplified in perforated *uvularia*, and round-leaved *bupleurum*.

Two opposite leaves cohering at their base, so as to form one body embracing the stalk, are termed by Linnæus *folia connata*. Many species of honey-suckle and hemp-agrimony furnish proper examples.

A glove-like leaf, *folium vaginans*, has the base formed into a tube or cylinder, which embraces the stalk like a sheath or glove; as in corn, grass, and many liliaceous plants.

Situation regards the respective position of the leaves between themselves. In this respect leaves are

Alternâte, when they come out singly, and are ranged gradually upon both sides of the stem, as in *antirrhinum cymbalaria*; opposite, when they come out in pairs, facing each other; the reverse of the former.

In most plants with opposite leaves, each pair is crossed by that immediately above or below it, so that the leaves point four different ways; thus, if one pair stands east and west, the one immediately below it stands north and south, and crosses the former at right angles; the third pair crosses the second,

second, and so on alternately, till all the pairs are completed. In this way are arranged the leaves of myrtle, jessamine, rocket, and several others.

Placed in whorls or rings, *verticillata folia*, when more than two leaves surround the stem. The different modifications of this term are derived from the number of leaves of which the ring consists; *folia terna*, when three, as in oleander; *quaterna*, four, as in *sedum verticillatum*; *quina*, five; *senaria*, six, as in *galium spurium*.

Starry leaves, *stellata*, a modification of the former term: when four, six or more leaves are so placed around the stem as to resemble a star, as in wood-roof and *galium*.

Scattered, *sparsa*, when they are disposed without any regular order; as in several species of lily.

Crowded, or disposed in clusters, *conferta*, when they come out from the sides of the branches in great numbers, and are placed so closely together, that it is not easy to discover their exact situation, as in toad-flax, and *antirrhinum monspessulanum*.

Laid over one another like tiles or fish-scales, *imbricata*, as in some species of saxifrage.

Placed in bundles, *fasciculata*, when many leaves proceed from the same point, as in the larch tree, and some pines.

Ranged along two sides of the branches only, *disticha*, as in the fir-tree.

With respect to direction, leaves are,

Oblique, *obliqua*, when the base looks to the sky, and the tip to the horizon, as in knee-holly, Persian fritillaria and protea.

Bent inwards, *inflexa*, when they are bowed or turned upwards towards the plant.

Laid close to the stem, *adpressa*.

Upright, *erecta*, nearly perpendicular; in other words, when they form an extremely small angle with the stem.

Spreading, *patentia*, when they recede from the stem, yet so as to form an acute angle with it.

Horizontal,

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Horizontal, *horizontalia*, or *patentissima*, when they stand at right angles with the stem.

Reclined, *reclinata et reflexa*, when they are bowed downwards in such a manner that the base is higher than the tip or summit.

Rolled back, *revoluta*, when the summit or tip is rolled inwards.

Depending, *dependentia*, when they point with their summits to the earth.

A rooting leaf, *folium radicans* is one, which being planted, strikes root, and vegetates. Such are the fleshy solid leaves of several liliaceous plants, as the aloe and sea-onion.

A floating leaf, *natans*, lies or floats on the surface of the water, as in the water-lily and pond-weed.

A drowned or sunk leaf, *demersum*, is that which is placed below the surface of the water, as in the sea-weed.

In most species of *ruscus*, or butcher's broom, the flowers grow upon different parts of the leaves; on the middle of the upper surface in *ruscus aculeatus et flexuosus*; on the middle of the under side in *ruscus hypophyllum et hypoglossum*; in which last the flowers issue from between the main leaf, and a smaller one resembling a tongue, which is placed near the middle of the under surface of the former. In *ruscus androgynus*, the flowers proceed from the margin or brim of the leaves.

The leaves furnish very elegant and natural marks in discriminating the species of plants. In no part, indeed, is nature more various than in the structure of the leaves, the very numerous species of which ought, therefore, to be carefully studied by the beginning botanist. Ray, Linnæus, Royen, and other eminent botanists, have borrowed the greater part of their specific names, as well as characters, from this part of the plant.

The opposition and alternation of the leaves furnish characters which are generally constant, that is, found to obtain in all the plants of the same genus, or even of the same natural order.

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In euphorbia, rock-rose, American viburnum, calves snout, lily and French willow-herb, these characters serve to distinguish the species; in some of which the leaves are opposite, or placed two by two; in others alternate.

In the different species of jessamine, speedwell and borage, the lower leaves at the branches are opposite; the upper leaves at the flowers, alternate.

Pond-weed, and a species of cinquefoil, have the lower leaves alternate; the upper ones at the branches, opposite.

In oleander, the lower leaves are opposite; the upper ones grow by threes, the lowest modification of leaves placed in a whorl or ring (*folia verticillata*). *Vide Supra*.

In butcher's broom, the lower leaves grow by threes; the upper ones are alternate: the branches have the same situation.

In a species of calve's snout, and tick seeded sun-flower, *coreopsis*, the lower leaves grow by fours; the upper ones are alternate.

The natural situation of the leaves in plants that are much branched, Linnæus thinks is best concluded from the radical or bottom leaves.

Opposite and compound leaves are often subject to luxuriance in the same species, and hence give rise to considerable varieties, which must, in all cases, be carefully distinguished from the species.

In some species of *lysimachia* and pimpernel, the leaves, which are generally opposite, grow occasionally by threes, fours, or fives.

A species of purple loose-strife has sometimes three leaves growing round the stalk.

As these, however, are but accidental varieties, and the characters in question are not permanent, but subject to vary when the plant is propagated from seed, we should be careful, in all such instances, not to load or incumber any genus of plants with an unnecessary multiplication of species, when the characters are not sufficiently constant to entitle any particular plant to that appellation.

When these varieties happen in plants with opposite leaves,
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the stalk, from being square, becomes furnished with many sides, as of six in the last instance.

Again, finger-shaped leaves, of which there are many different modes, occasionally gain an addition of one or two leaves in the same species, as in some trefoils.

Curled leaves, *folia crispa*, which are a frequent variety, Linnæus denominates a sort of monstrous production, and compares them to the prodigious multiplication of the petals in full flowers. Without doubt, no genuine species of plants has curled leaves, the appearance being accidental and inconstant: yet botanists, till the time of Linnæus, not attending to this circumstance, have considered as distinct species, many plants in which the supposed character of the species is but occasionally present. To say truth, Linnæus's greatest merit consists in the excellent rules he has laid down for establishing the species and varieties, particularly the latter, which he found involved in one undistinguished chaos, but has now happily reduced into the most perfect symmetry and order.

The curled leaves, just mentioned, are to be found in some species of mallow, dock, nipplewort, hart's-tongue, endive, and bastard rocket.

Intanfy, feverfew, basil, and mint, when the leaves are curled, their scent is considerably heightened.

We explained above the nature of a bladdery or blistered leaf, by botanists termed *folium bullatum*. The warted leaf, *folium verrucosum*, is a species of the former; and, both seem to be incidental varieties, produced from the luxuriance of a wrinkled leaf, *folium rugosum*, as curled leaves are a preternatural extension of an undulating or waved one.

Instances of bladdery and warted leaves may be seen in some species of basil, brassica and lettuce.

In a species of soapwort, termed by Miller *saponaria hybrida*, and by Linnæus *saponaria concava anglicana*, the leaves are generally hollowed like a spoon, or ladle. *Vide CARYOPHYLLEI in fine.*

In some species of cow-parfnep, water hore-hound, brassica, elder, and valerian, the leaves are incidentally found

to vary from broad-leaved to narrow-leaved ; but this variety is less frequent.

Such are the principal varieties to which leaves are incident in their form and structure. I conclude this article, with observing, that in the enumeration of terms expressive of the form and configuration of the leaves, I have purposely avoided mentioning such whose meaning is sufficiently obvious, without any laboured elucidation. The reader will observe too, that I seldom offer an explanation, without accompanying it with as familiar an example as the nature of the thing will admit. Without an illustration of this kind, every such explanation must be inadequate and unsatisfactory ; and yet, Linnæus has in very few instances favoured us with any : nor have his latinized translators, Lee and Berkenhout, discovered any vehement inclination to remove the thick cloud, which still rests on every part of this delightful science. — In assimilating the vegetable and animal kingdoms, Linnæus denominates leaves, the lungs of plants.

FOLICULUS, (diminutive from *follis*, a leather bag) ; a species of seed-vessel ; generally consisting of one valve, synonymous to *conceptaculum*, and substituted for it in the later editions of Linnæus's works. *Vide* CONCEPTACULUM.

FOLLICULI are likewise defined by the same author to be small glandular vessels distended with air, which appear on the surface of some plants ; as at the root of water-milfoil, and on the leaves of aldrovanda. In the former, the vessels in question are roundish, and furnished with an appearance like two horns ; in the latter, pot-shaped and semi-circular.

FRAGMENTA *Methodi Naturalis*, the Fragments of a Natural Method ; Linnæus's title of a plan or sketch of a natural arrangement of plants, which he has barely traced in the *Philosophia Botanica* and *Genera Plantarum*. The Author of the present work has the honour of having been the first who attempted to complete the draught of which only the outline had been furnished by the great Maller ; his Descriptions of the habit and structure, virtues, sensible qualities and æconomical uses of the plants which compose the several Natural Orders of Linnæus having been submitted by

him to the public in the first edition of the Botanical Dictionary, published in 1770, in precisely the same form in which they now appear. Linnæus's own Lectures on the subject, from the notes of Giseke and Fabricius, two of his pupils, were not given to the world till a long time after *.

FREQUENS *Planta*, a plant so termed by Linnæus, which grows spontaneously and copiously in a proper soil. The term is synonymous to *vulgaris planta* of the same author.

FRIGIDÆ *Plantæ*, from *frigus*, cold; plants that are natives of cold climates. Such are those of the Alps, Siberia, Canada, Germany, Holland, England, and France to the northward of Paris.

These plants, says Linnæus, scarce bear a degree of heat that is as 30 on a scale in which 0 is the freezing point, and 100 the heat of boiling water. In excessive heats, they first prove luxuriant, then turn feeble and die.

FRONDESCENTIA, (from *frons*, the leaf of a tree,) a term expressive of the precise time of the year and month in which each species of plants unfolds its first leaves.

All plants produce new leaves every year; but all do not renew them at the same time. Among woody plants, the elder, and most of the honey-suckles; among perennial herbs, crocus and tulip, are the first that push or expand their leaves. The time of sowing the seed decides with respect to annuals. The oak and ash are constantly the latest in pushing their leaves: the greatest number unfold them in spring; the mosses and firs in winter. These striking differences, with respect to so capital a circumstance in plants as that of unfolding their leaves, seem to indicate that each species of plant has a temperature proper or peculiar to itself, and requires a certain degree of heat to extricate the leaves from their buds, and produce the appearance in question.

This temperature, however, is not so constant as, to a superficial observer, it may appear to be. Among plants of the same species, there are some more early than others; whether that circumstance depends, as it most commonly

* In 1792.—See more upon this subject in the Preface.

does, on the nature of the plants, or is owing to differences in heat, exposure, and soil. In general, it may be affirmed, that small and young trees are always earlier than larger or old ones.

The pushing of the leaves is likewise accelerated or retarded according to the temperature of the season; that is, according as the sun is sooner or later in dispensing that certain degree of heat which is suitable to each species.

Till very lately the time in which plants renew or unfold their leaves, was considered as an absolute fixed term or limit, happening every year, nearly at the same time, in every climate. Linnæus is the only one who has paid proper attention to this curious subject. His design in publishing the observations which he had made in eighteen provinces of Sweden, situated betwixt the sixtieth and seventieth degrees of north latitude, during the three successive years, 1750, 1751 and 1752, was merely to discover what trees begin to open their buds and unfold their leaves, at the most proper time for sowing of barley.

The birch-tree appeared to him the most proper indication for this purpose; and he concludes, that in every province in Europe, there may be found trees, in default of the birch, that will, in the like manner, indicate the proper time for sowing grain and esculent herbs. These observations, however, do not perfectly answer the purpose for which they were made, as the birch, and every other similar tree, can only indicate the past or present, not the future; which, by the way, is the only thing importing the husbandman to know, that he may have time to prepare the ground and sow the seed; besides, the species birch, like most other trees, has individuals, which are three or four weeks later than the rest; so that if we have not an opportunity of seeing more than one tree, we cannot possibly divine whether it is the latest or earliest of its species, and thus may often run the risk of delaying to sow the seed a whole month beyond its proper time.

In short, to be able to draw any certain conclusions, with respect to the time in which the different plants of different

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climates unfold their leaves, and to reduce their apparent variations to fixed and precise rules, we must

I. Observe the different times in which different individuals of the same species unfold their leaves; and thence draw the mean times betwixt the earliest and latest.

II. Observe, by a thermometer, the difference of temperature in the early and late years.

III. Draw mean results of the degrees of heat observed every month and every day, for a sufficient number of years.

IV. Observe the days in which the frosts begin to cease, and those in which there are ten degrees of heat, even during the night. These are the times in which vegetation, formerly clogged, if not altogether flopt, begins to make progress, and to continue without interruption.

Lastly, From the extreme products of each of these observations, we must draw mean results; as without such precaution, nothing certain can be obtained in enquiries of this kind.

For the application of these observations, the reader is referred to the ingenious M. Adanson's *Familles des Plantes*, a book which for variety of botanical knowledge, exceeds any hitherto published.

FRONDOSUS *flos.* *Vide* PROLIFER *flos.*

FRONS, is defined by Linnæus to be the trunk of the palms and ferns, in which the leaves are confounded with the stem and branches, and frequently with the flower and fruit. The term, indeed, seems to import the union of a leaf and a branch; and that the pretended trunk in question is really a compound leaf, appears from this circumstance, that it has plainly two sides, which are different in figure and colour; whereas all the parts of a real trunk or stem are perfectly similar.

The leaves of the ferns and palms are generally winged. The base of the foot-stalk, or that part which has no *pinnæ* or lesser leaves proceeding from it, constitutes, according to Linnæus, another trunk, which he denominates *stipes*.

FRUCTESCENTIA, (from *fructus*, fruit,) comprehends the

the precise time in which, after the fall of the flowers, the fruits arrive at maturity, and disperse their seeds.

In general, plants which flower in spring, ripen their fruits in summer, as rye; those which flower in summer, have their fruits ripe in autumn, as the vine; the fruit of autumnal flowers ripens in winter, or the following spring, if kept in a stove, or otherwise defended from excessive frosts. These frosts, says M. Adanson, are frequently so pernicious and violent as to destroy the greatest part of the perennial plants of Virginia and Mississippi that are cultivated in France, even before they have exhibited their fruit. The plants which flower during our winter, such as those of the Cape of Good Hope, ripen their fruit in spring in our stoves.

The time in which plants ripen their fruit, combined with that in which they germinate and unfold their leaves, gives the entire space or duration of their life, which, in the same species, is proportionably short or long, according to the greater or less intensity of heat of the climate, in which they are cultivated.

In general, it appears, that if the heat is equal and uninterrupted, the time betwixt the germinating or sprouting and flowering of annual plants, is equal to the interval betwixt their flowering and the maturation of their fruits, or even the total destruction of the whole plant.

In Senegal and the other burning climates, an annual plant generally lives as long before as after flowering.

In temperate climates, as France and England, plants which rise in spring and flower before the month of June, live a little longer before than after flowering; such as flower in summer, as barley and oat, which flower in June, live as long before as after; while the later plants, which do not rise till autumn, live longer after flowering than before.

These facts, which are undoubted, prove the very great efficacy of heat in operating the vegetation of plants. In effect, it is in summer, when the heat is most equal, that the life of plants is equally divided into two parts; whereas in spring and autumn, when the heat is more unequal, it is cut

or divided unequally : the plants of the spring season, which is colder in the beginning, live, as we have said, longer before flowering than after, when the heat is more intense : and, on the contrary, the plants of autumn, which is warmer in its beginning, live a shorter time before than after flowering, when the heat becomes every day less, and consequently retards the maturation of the fruit.

These observations are only to be understood of herbaceous vegetables, and those chiefly annual. Among trees, some do not renew their leaves till a little before, and sometimes not till after, they have produced flowers ; so that there is a much greater interval between their flowering and the maturation of their fruit, than between the former and the unfolding of their leaves, which, in trees, may be considered as equivalent to the germination or sprouting of the seed in annuals. The maturation of the fruit in trees is never accomplished, while they abound in sap, and produce new wood ; for this reason, when we would accelerate the bearing of fruit-trees, we generally strip off a part of their leaves, which diminishes the motion of the sap, and thus removes the obstruction which retarded the ripening of the fruit. *Vide FOLIUM.*

FRUCTIFICATIO, (from *fructus*, fruit, and *facio*, to make.) Under this name Linnæus comprehends the flower and the fruit, which, according to the Sexualists, are connected in the same manner as generation and birth in animals. In fact, although the fruit does not swell and ripen till after the flower is fallen, yet it seems now to be generally allowed, that its first beginning or rudiment is in the flower.

Fructification is defined to be a temporary part of plants appropriated to generation, terminating the old vegetable and beginning the new. The parts of fructification are, by Linnæus, reckoned seven : viz.

The calyx, empalement, or flower-cup.

The corolla, or petals.

The stamina, threads, chives, or male organs.

The pistillum, pointal, or female organ.

The pericarpium, or seed-vessel.

The seeds.

The receptacle or base, upon which all the other parts are seated.

The four first are properly parts of the flower; the three last, of the fruit. The germen or seed-bud connects them together. This is properly part of the flower, as being the base of the pistillum; yet as, in process of time, it becomes the seed-vessel, it is generally considered as a part of the fruit: and hence, if the perianthium or flower-cup surrounds it alone, it is called a perianthium of the fruit.

The essence of every vegetable, says Linnæus, consists in the fructification: the essence of the fructification consists in the flower and fruit.

The various aphorisms established by modern botanists with respect to the importance of the parts of fructification in vegetable arrangement, are delivered in several parts of this work; particularly under the articles *CLASSIS*, *GENUS* and *CHARACTERES*. The following fall properly enough to be established in this place.

I. The primary disposition or arrangement of vegetables ought, with due restrictions, to be derived from the parts of fructification. Former botanists urged the insufficiency of these parts to serve as a foundation for the classes and genera; because, perhaps, they were not all so accurately known as at present: and, even with all our superior knowledge, we are often at a loss in ascertaining several genera of plants, without calling in the assistance of parts unconnected with the fructification.

By a rigid attention to the aphorism just mentioned, Linnæus has converted into species many genera of Tournefort, Dillenius, Boerhaave, Ruppius, Vaillant, Micheli; and Gmelin, which are not founded upon the parts of fructification alone.

The following genera of Tournefort, among many others, furnish examples.

Purple bird's-nest is, by Linnæus, converted into a species of orchis.

Bistort, of knot-grass.

Turnip, of cabbage.

Skirrets, of water-parfney.

Hermodyctylus, of Iris.

Orpine, of lesser house-leek or sedum.

Flea-wort, of plantain.

Cork-tree, of the oak.

Larch-tree, of the pine.

Dwarf broom, of single-seeded broom or genista.

Dragons, of cuckow-pint.

English black maiden-hair, of spleen-wort.

The bean, of the vetch.

Water-melon, of the gourd.

II. Vegetables which agree in all the parts of fructification are not to be arranged in different classes, orders, or genera.

Gesner was the first who suggested this aphorism; Cæsalpinus the first who reduced it into practice.

III. The more constant any part of fructification is, throughout a great number of species, the more certainly is it to be depended on as a characteristical mark in distinguishing the genera.

The nectarium of the genus *hypecoum* is constant, but not the jointed pod.

The spotted berry of the genus *convallaria* is found in all the species; the corolla in lily of the valley, Solomon's seal and one blade, three species of *convallaria*, is very different.

The corolla of wild fœna is constant, but not the pod.

In the genus *lobelia*, which includes several genera of other authors, the corolla is constant. The seed-vessel, in cardinal-flower, rapuntium of Tournefort and Dillenius, laurentia of Micheli, and lobelia of Plumier, which are all species of the Linnæan genus, is different. That particularly of the last species, the lobelia of Plumier, is pulpy, and of the cherry kind, containing a nut or stone with two cells; whereas in the other species, it is a dry membranaceous capsule.

In yervain, the calyx and corolla are constant throughout the species: the stamina and seeds are different.

FRUCTIFLORÆ, (from *fructus*, fruit, and *flor*, a flower);

flower); the name of the tenth class in Royen's Natural Method, consisting of plants, in which the flower, or, to speak more properly, the receptacle of the flower is placed above the fruit: it corresponds to the class *coronatrices* in Linnæus's *Methodus Calycina*, and is exemplified in French willow-herb.

FRUCTISTÆ, (from *fructus*, fruit;) a class of Systematic Botanists so termed by Linnæus, who have arranged vegetables from the seed-vessel, seeds and common receptacle, the three parts of the fruit. The best systems of this kind are those of Cæsalpinus, Morison, Ray, Christopher Knaut, Hermannus, and Boerhaave. *Vide METHODUS.*

FRUCTUS, the fruit; defined by Jungius and former botanists to be an annual part of the plant, which adheres to the flower and succeeds it; and, after attaining maturity, detaches itself from the parent plant; and, being commodiously lodged in the bosom of the earth, gives birth to a new vegetable. This definition is sufficiently accurate, and so perspicuous, that it requires no illustration. I shall only observe, that, in its vulgar acceptance, the word fruit is expressive, not of the seeds, which are doubtless the essence of every fruit, but of the case or vessel in which they are contained. Thus, when we speak of the fruit of an apple-tree, we always mean the luscious pulp which enfolds the seeds; although that, in strict propriety, is only the cover of the fruit.

The Sexual System being founded on the supposed impregnation of the seeds by the male dust, the importance of that part of the plant, (the seed) is considerably augmented: accordingly Linnæus, among the other principles with which his Method sets out, establishes the aphorism manifestly deducible from Jungius's definition, that a fruit is constituted by the presence of the seed, whether there be a seed-vessel or not; and to this he immediately subjoins, that all vegetables are furnished with fruit, that is, seeds; though these are frequently so minute, or so situated, as to elude the sight. *Vide FLOS.*

With respect to the imperfect plants here manifestly alluded to,

to, the seeds of the *fuci* were discovered in 1711, by M. de Reaumur; those of the mosses by Dillenius, in 1719 and 1741. Linnæus, in his *Philosophia Botanica*, arrogates the discovery of the latter tribe of plants to himself. “*Semina muscorum*,” says he, “*ego detexi*.” Micheli was the first who in 1729, detected the seeds of mushrooms; his curious discoveries in this, till of late, shamefully neglected tribe of vegetables, were confirmed by the observations of Mr. Gleditsch, in 1753; and of M. Battarra, in 1757.

The seeds of some ferns were discovered by Dr. Bobart of Oxford; those of others, by Bernard de Jussieu, in 1739; and of M. Maratti in 1760.

FRUCTUS *carnosus*, fleshy or pulpy fruit. The name given by some former botanists to that species of succulent seed-vessel called by Linnæus, *Pomum*. *Vide POMUM*.

FRUMENTA, corn; the name of the twenty-first class in Ray's *Methodus Propria*, consisting of the esculent grains; as oat, rye, barley, and the like.

FRUTEX, a shrub; a plant which rises with a woody durable stem to a height superior to that of under-shrubs, inferior to that of trees. Trees too always rise with a single body or trunk. Many shrubs have several stems growing out of the same root.

For the opinions of different authors concerning the foundation of the distinction of vegetables into herbs, trees, shrubs, and under-shrubs, see the article **ARBOR**.

FRUTICES. The name of the second class in Morison's System, and of a distinction in all the systematic botanists prior to Linnæus, consisting of those woody plants termed shrubs. *Vide supra*.

FUCATÆ figuræ; figures of plants coloured from nature; such are those of Martin, Blackwell, and Weinmannius.

FULCRA, props, supports. By this name Linnæus distinguishes certain minute external parts, which serve either to support or defend the plants on which they are found, from external injuries; or to facilitate some necessary secretion.

These

These *fulcra* have undergone considerable alterations since their first publication in the *Fundamenta Botanica* in 1736, when they stood thus: *bractea*, *cirrus*, *spina*, *aculeus*, *stipula*, *glandula*. In a subsequent edition of the same book, printed at Paris in 1744, they are augmented to nine, by the addition of *scapus*, *petiolus* and *pedunculus*, which were formerly considered as different species of trunks. In the *Philosophia Botanica*, published in 1755, the three terms which were formerly added are again transferred to the head of trunks, and another term is joined to the original list, so that it stands thus; *stipula*, *bractea*, *spina*, *aculeus*, *cirrus*, *glandula*, *pilus*. Lastly, in the *Termini Botanici*, published in the *Amœnitates Academicæ* by Elingren, a pupil of Linnæus; and in the *Delineatio Plantæ*, prefixed to the second volume of the *Systema Naturæ*, the *fulcra* undergo another revolution. Instead of *aculeus* and *spina* the different offensive weapons of plants, is substituted the general term *arma*: and instead of *pilus*, a particular species of defensive weapon, is substituted *pubes*, which implies every kind of pubescence or hairy appearance on the surface of plants. *Glandula*, which had appeared in the very earliest editions of Linnæus's works, is not now to be found in the list of *fulcra*, being included in the general term *pubes*; and the partial trunks, as they were formerly reckoned, *petiolus* and *pedunculus*, once more change their place, and are transferred to an article with which they have no connection. The list of *Fulcra*, thus new-manufactured, stands as follows:

Petiolus, the foot-stalk of the leaf.

Pedunculus, the foot-stalk of the flower.

Stipula, a scale seated at the insertion of the foot-stalks.

Bractea, a coloured leaf accompanying the flower.

Cirrus, a tendril or clasper.

Arma, the offensive weapons of plants.

Pubes, the hairs, defensive weapons, or secretory vessels of plants.

A particular description of each of these auxiliary parts is given under its respective term.

FUNDAMENTALES *figuræ*, figures of plants not shaded, outlines; such are those of Brunsfelsius, Fuchsius, Clusius, and Father Plumier.

FUNGI, mushrooms. The name of one of the seven families or tribes into which all vegetables are divided by Linnæus in his *Philosophia Botanica*. In the Sexual System, they constitute the fourth order of the class *Cryptogamia*; in Tournefort's Method, a part of the seventeenth class, entitled *aspermæ vulgo habitæ*.

In Ray's and Haller's Methods is likewise a class of the same name, containing the same plants. These have all a very similar appearance; and as the parts of fructification, which by modern botanists are solely attended to in distinguishing the genera, are scarcely to be discovered, the consequence has been, that, till lately, scarce any distinction of the genera has been attempted, and of course, this very considerable part of the vegetable kingdom, to the great reproach of science, lay much uncultivated. I must not, however, forget, upon this occasion, to do that justice which is so eminently due to the ingenious researches of Dillenius and Micheli, to whom we were long indebted for most of the little knowledge we possessed of the *Fungi*, as well as some other tribes of imperfect plants.

The former, in his *Catalogus Plantarum circa Gissam*, published at Francfort in 1719, arranges mushrooms from the figure of their footstalk, their hat or upper part termed *pileus*, its *laminæ* or plates, holes and cavities, into ten genera, which contain in all about two hundred species.

Micheli, in a work entitled *Nova Plantarum Genera*, published at Florence in 1729, arranges this tribe of plants from the figure of their flowers, and the situation of the stamina and seeds, which, as he imagined, he had detected in the greatest number.

Micheli's method is divided into four sections, which contain in all about eight hundred species, arranged under thirty genera, accurately and perspicuously distinguished. This author is the first who, by means of the microscope, discovered something like stamina in the mushrooms: and
attempted

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attempted to prove that these plants, like the more perfect ones, are produced from seed.

Gleditsch's Arrangement of the mushrooms, published at Berlin, in 1753, differs but little from that of Micheli just mentioned. This author describes with accuracy about a thousand species or varieties of these plants, and gives figures of each of his genera, copied from those of Micheli.

Battarra, in his Enumeration of the mushrooms that grow in the neighbourhood of Rimini, printed in 1755, has given figures and descriptions of two hundred and sixty species, which are distributed, not very methodically indeed, among eighteen sections or orders, which might, without hurting the work, have been reduced to seven.

The author proves in this work, that mushrooms owe their existence, not to putrefaction, as had been erroneously imagined, but to seeds; that those which grow upon vegetables have their fibres contiguous only to these plants, not continuous with them; and in fact, have their own proper roots, as other vegetables. He has likewise evinced, that they are not a *lufus naturæ*, but that their species are constant, and renewed by uniform laws, as many species, which grow in Italy, grow likewise in Britain, France, Germany and Turkey; and as he, Micheli, and Gleditsch had succeeded in their experiments for raising mushrooms similar to those which they had sown.

After all, our knowledge of this part of vegetable nature is exceedingly limited; and, as I have often had occasion to observe in the course of this work, a very intimate acquaintance with these and plants of a similar character, is scarcely to be expected during the dominion of the Sexual System: for, as the parts of fructification in these plants, if they are indeed such, can only be detected by the aid of glasses, it is impossible they should be so universally known, as to give much assistance in detecting the genus, far less be of themselves sufficient towards that detection.

FUNGI, the name of the fifty-eighth order in Linnæus's Fragments of a Natural Method, consisting of the following genera,

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genera, which are the same with those of the fourth order of the class Cryptogamia in his Artificial Method, with the addition of byffus, which is there joined to the algæ or sea-weed.

List of the Genera contained in this Natural Order.

Linnæan Genera.	English Names.
<i>Agaricus,</i>	Agaric.
<i>Boletus.</i>	
<i>Byffus.</i>	
<i>Clathrus.</i>	
<i>Clavaria,</i>	Club-top.
<i>Elvela seu Helvella,</i>	Turban-top.
<i>Hydnum.</i>	
<i>Lycoperdon,</i>	Puff-ball.
<i>Mucor,</i>	Mould.
<i>Peziza,</i>	Cup-mushroom.
<i>Phallus,</i>	Stinkhorns, Morell.

These plants are rarely branched, sometimes creep, but are most commonly erect. Such as are furnished with branches have them of a light spongy substance like cork. Mushrooms differ from the fuci in that those, which, like the fuci, have their seeds contained in capsules, are not branched, as that numerous class of sea-weed is.

The greatest part of mushrooms have no root; some, in their stead, have a number of fibres, which, by their inoculations, frequently form a net with unequal meshes, some of which produce plants similar to their parent vegetable.

The STAMINA, in these plants, are still undetermined. What Micheli takes for this pretended male organ has all the appearance of a number of shoots or suckers, under the form of a fine powder or dust.

The SEEDS are either spread over the surface of the plant, or placed in cavities which are open, and resemble the open

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open capsules of some of the fungi. In mushrooms which are branched, the seeds are frequently visible by the naked eye, and always to be distinctly observed with the assistance of a good microscope.

These plants are very astringent, and of familiar use for stopping violent hæmorrhages.

As a vegetable food, they are, at best, suspicious. Several *Fungi* are rank poison.

Agaric is an excrescence found upon the trunks and large branches of several trees, but chiefly upon the larch, and some oaks. It is of two sorts, the male and female; the former is yellow, hard and woody, and used for dying black; the latter is covered with a yellow bark, and white within: it tastes sweet at first, but becomes bitter after being held a short time in the mouth. This is the sort used in medicine. It is administered in infusion, from two drams to half an ounce, and in substance from one to two drams. Being a very strong purgative, it ought to be corrected with ginger, cloves, cinnamon, mace, mint, or some fixed salt. The troches prepared of agaric and ginger are commonly prescribed in inveterate disorders and obstructions of the bowels from half a dram to one dram. From agaric is likewise drawn an extract and a resin. It enters into several purgative compositions, particularly the confection of hammech, hiera picra, the blessed extract, and pills of euphorbium.

Jew's ears, the *peziza auriculam referens* of Ray and Caspar Bauhin, is a fungous excrescence resembling an ear, found on the stumps of elder-trees, before their leaves appear. It is in great esteem among the common people as a remedy for sore throats, but is seldom found in the shops.

The powder, which is found in the cavity of some species of *lycoperdon* after bursting, is a very powerful astringent: and, mixed with the white of an egg, is effectual in stopping all sorts of hæmorrhages.

FURCÆ, Forks: a species of armature or offensive weapon, with which some plants are furnished. They are of the nature of prickles, being, like them, detached from the

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the bark or outer rind only, and consist of two or three prongs. The term is exemplified in berry, currant-tree, triple-thorned acacia, hard seeded chrysanthemum, black horehound, barleria, *fagonia*, and garden burnet.

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G ALEA *Corollæ ringentis*, the helmet or upper lip of a grinning or gaping flower. The term was invented by Rivinus, and stands opposed to *barba-ringentis*, the beard or lower lip.

GEMMA, a bud, a compendium of a plant seated upon the stem and branches, and covered with scales, in order to defend the tender rudiments inclosed from cold and other external injuries, till their parts being unfolded, they acquire strength, and render any further protection unnecessary.

Buds, together with bulbs, which are a species of buds generally seated upon or near the root, constitute that part of the herb by Linnæus called *Hybernacula*; that is, the winter quarters of the future vegetable—a very proper appellation, as it is during that severe season that the tender rudiments are protected in the manner just mentioned. *Vide* BULBUS.

Plants, considered in analogy to animals, may properly enough be reckoned both viviparous and oviparous. Seeds are the vegetable eggs; buds, living fœtuses, or infant plants, which renew the species as certainly as the seed.

Mr. Ray was the first who gave the name of *gemma* to the bud, which had formerly been denominated *germen*. *Gemma*, indeed, was used to signify one kind of bud, that containing the flower, which we now denominate *oculus*, an eye; but was by the ancients carefully distinguished from the *germen*, or bud containing the leaves and wood, hence termed by the French, *bouton à bois*.

Pliny marks this distinction in the following words.
 " *Germen autem est id quod ex ipsis furculis arborum primo*

primo vere exit, ex quo deinde folium producitur: nam gemma proprie est floris, quanquam utrumque confundatur." Notwithstanding this obvious remark of Pliny, the modern botanists, after the example of Ray, have applied the term *gemma* to every kind of bud, whether of the flowers or leaves; the other term *germen* being appropriated to the seed-bud, or that part of the flower which swells and becomes the seed-vessel vulgarly termed the fruit.

With respect to its external form or figure, a bud is a small rounded body, sometimes ending in a point. In the different species, however, of the same genus, the form of the buds is so different, as frequently to afford an excellent mark of distinction during the winter. This is particularly exemplified in many species of willow and buckthorn, especially the former.

Buds are placed at the extremity of the young shoots, and along the branches, being fixed by a short foot-stalk upon a kind of brackets, the remainder of the leaves in the wings or angles of which the buds in question were formed the preceding year. They are sometimes placed single; sometimes two by two, and those either opposite or alternate; sometimes collected in greater numbers in whirls or rings.

With respect to their construction, buds are composed of several parts artificially arranged. Externally, we find a number of scales that are pretty hard, frequently armed with hairs, hollowed like a spoon, and placed over one another like tiles. These scales are fixed into the inner plates of the bark, of which they appear to be a prolongation. Their use is to defend the internal parts of the bud, which, being unfolded, will produce, some, flowers, leaves, and stipulæ; others, foot-stalks and scales. All these parts, while they remain in the bud, are tender, delicate, folded over one another, and covered with a thick clammy juice, which is sometimes resinous and odoriferous, as in the *tacahamac-tree*. The external scales fall off after the entire expansion of the internal parts.

In general, we may distinguish three kinds of buds: that

containing the flower, that containing the leaves, and that containing both flower and leaves.

The first, termed *gemma florifera*, and by the French, *bouton a fleur ou au fruit*, contains the rudiments of one or several flowers folded over one another, and surrounded with scales. In several trees, this kind of bud is commonly found at the extremity of certain small branches which are shorter, rougher, and less garnished with leaves than the rest. The external scales of this species of bud are harder than the internal; both are furnished with hairs, and in general, more swelled than those of the second sort. The bud containing the flower, too, is commonly thicker, shorter, almost square, less uniform, and less pointed, being generally terminated obtusely. It is called by Pliny *oculus gemma*, and is employed in that species of grafting called inoculation or budding.

The second species of bud, (that containing the leaves, termed *Gemma foliifera*, and by the French, *Bouton a feuilles ou a bois*,) contains the rudiments of several leaves which are variously folded over one another, and outwardly surrounded by scales, from which the small stipulæ that are seated at the foot of the young branches, are chiefly produced. These buds are commonly more pointed than the former sort. In the hazel-nut, however, they are perfectly round; and in horse-chestnut very thick.

The curious and various ways in which the leaves are folded up in this kind of bud, are particularly enumerated under the article VERNATIO, which see.

The third sort of bud is smaller than either of the preceding, and produces both flowers and leaves, though not always in the same manner.

Sometimes the flowers and leaves are unfolded at the same time. This mode of the flower-and-leaf-bud, is termed by Linnæus, *gemma foliifera & florifera*, and admits of the following distinctions from the sex of the flowers so produced with the leaves: male-flower and leaf-buds, as in the pine and fir-tree: female-flower and leaf-buds, as in hazel-nut and horn-beam: hermaphrodite-flower and leaf-buds, as in the elm-tree, cornel-tree, mezereon, and almond tree.

Sometimes the leaves emerge out of this kind of bud upon a small branch, which afterwards produces flowers. This mode of the flower-and-leaf-bud, is termed by Linnæus, *gemma foliifero-florifera*, and is the most common bud of any.

Such buds as produce branches adorned only with leaves, are called barren; such as contain both leaves and flowers, fertile: the varieties of the last have been just specified. From the bulk of the bud we may often, with ease, foretell whether it contains leaves only, or leaves and flowers together, as in cherry and pear-tree.

The scales which envelop the bud, consist chiefly of a cuticle or scarf-skin, and a parenchyma or medullary pulpy part. They are, as we have said, for the most part, hairy, particularly in the margin; and the internal surface is covered with a slight down, in the same way as the leaves contained or folded up in the bud.

The thick clammy juice, which oozes from the scales and leaves of the bud, serves not only to defend the more tender parts of the embryo-plant from cold, the assaults of insects, and other external injuries; but likewise from excessive perspiration, which, in its young and infant state, would be very destructive. This is conspicuous in the buds of horse-chestnut, poplar, and willow-trees.

Neither the buds produced on or near the root, called by some authors tuiones, nor those produced on the trunk, and from the angles or wings of the leaves, contain, in strict propriety, an entire delineation of the plant, since the roots are wanting: and in various buds, as we have seen, shoots are contained with leaves only, and not with flowers: but as a branch may be considered as a part similar to the whole plant, and if planted, would, in process of vegetation, produce roots and flowers, we may, in general, allow that the bud contains the whole plant, or the principles of the whole plant, and thus resembles the seed, in containing a delineation of the future plant in embryo: for although the bud wants a *rostellum* or radicle, of which the seed is possessed, yet it would undoubtedly form one, if planted in the

earth. But as the medullary part adhering to the bud is too tender, and by the abundance of juice flowing into it from the earth, would be disposed to putrefaction, the buds are not planted in the soil, but generally inserted within the bark of another tree; yet so placed that the production of the marrow or pith adhering to them, may be inserted into the pith of the branch in which the fissure or cleft is made; by which means there is a large communication of juice. This propagation by gems or buds, called inoculation, is commonly practised with the first sort of buds above described.

From the obvious uses of the buds, we may collect the reason why the supreme Author of Nature has granted this sort of protection to most of the trees that are natives of cold climates: and, on the other hand, denied it to such as, enjoying a warm benign atmosphere, have not the tender parts of their embryo-shoots exposed to injuries and depredations from the severities of the weather. Of this latter kind are the plants of the following list, some of them very large trees; others, smaller woody vegetables, of the shrub and under-shrub kind:—Citron, orange, lemon, cassava, mock-orange, blad-apple, shrubby swallow-wort, alaternus, shrubby geraniums, berry-bearing alder, Christ's thorn, Syrian mallow, baobab, or Æthiopian four-gourd, justicia, wild senna, the acacias and sensitive plant, coral-tree, stinking bean-trefoil, medicago, oleander, viburnum, sunach, ivy, tamarisk, heath, Barbadoes cherry, lavatera, rue, shrubby night-shades, Guinea henweed, cypress, lignum vitæ and savine a species of juniper.

On annual plants, whose root, as well as stalk, perishes after a year, true buds are never produced; in their stead, however, are protruded small branches like a little feather, from the wings of the leaves, which wither without any further expansion, if the plants climb, and have no lateral branches; but if, either by their own nature, or from abundance of sap, the plants become branched, the ramuli just mentioned obtain an increase similar to that of the whole plant.

The same appearance obtains in the trees of warm countries, such as those enumerated in the above list, in which a plumula, or small feather, sends forth branches without a scaly covering, as in such countries, this tender part requires no defence or protection from cold. A scaly covering then is peculiar to buds, as it protects the tender embryo enclosed from all external injuries. When we speak, therefore, of trees having buds that are naked or without scales, our meaning is the same as if we had said, that they have no buds at all.

Ray and Pontedera have instituted a division of vegetables into herbs and trees from the buds. The former they have distinguished by the name of plants wanting buds; the latter by that of plants bearing buds.

This division, however, is certainly erroneous; most trees of warm climates being, as we have already shewn, devoid of buds, at least of that scaly appearance which seems essential to every bud.

The buds that are to be unfolded the following year, break forth from the evolved buds of the present year, in such a manner, as to put on the appearance of small eminences in the wings or angles of the leaves. These eminences or knots grow but little during the summer, as, in that season, the sap is expended on the increase of the parts of the plant: but in autumn, when the leaves begin to wither and fall off, the buds, placed on the wings, increase; and the embryo-plant contained in the bud, is so expanded, that the leaves and flowers, the parts to be evolved the following year, are distinctly visible. Thus in horse-chestnut, the leaves, and in cornel-tree, the flowers, are each to be observed in their respective buds.

As each bud contains the rudiments of a plant, and would, if separated from its parent-vegetable, become every way similar to it, Linnæus, to shew the wondrous fertility of nature, has made a calculation by which it appears, that, in a trunk scarce exceeding a span in breadth, ten thousand buds (that is, herbs) may be produced. What an infinite

number then of plants might be raised from a very large tree!

GEMMATIO, from *gemma*, a bud; a term used by Linnæus expressive of the form of the buds, their origin, and their contents. It includes both those properly called buds, and those which are seated upon the roots, stiled bulbs.

As to the origin of buds, they are formed either of the foot-stalks of the leaves, of *stipulæ*, or of scales of the bark. Their contents have been already discovered, in the preceding article, to be either flowers, leaves, or both. *Vide supra*.

GENERATIO. *Vide* SEXUS.

GENITALIA. By this appellation Linnæus and the sexualists denominate the *anthers* and *stigma* of the flowers; the first, in their judgment, performing the function of the male-organ of generation in plants, the other, of the female. *Vide* SEXUS.

GENITURA, the generating substance of plants. By this name, Linnæus, in his fancied analogy betwixt vegetables and animals, distinguishes, from its supposed use, the *pollen*, that fine powder or dust, which, when ripe, is discharged by the *anthers* or tops of the stamina, and falls upon the *stigma*, for the purpose of impregnation. *Vide* POLLEN.

GENUS, a race or kind; one of the five members or parts into which every system or regular method of arrangement resolves itself.

A genus is an assemblage of several species; that is, of several plants which resemble one another in their most essential parts. Hence it is aptly enough compared to a family, all the relations of which bear the same surname, although every individual is distinguished by a particular specific name.

The establishment of genera renders botany more simple and easy, by abridging the number of names, and arranging under one denomination, termed the generic name, several

ral plants, which, though different in many other respects, are found invariably to possess certain relations in those essential parts, the flower and fruit. Plants of this kind are termed by botanists *plantæ congeneres*, that is, plants of the same genus.

The works of Theophrastus, Dioscorides, Pliny and Galen, leave us no room to doubt that the ancients had some knowledge of plants: but they as certainly convince us, that their knowledge was extremely limited, and very superficial. In the ages which immediately succeeded that of Pliny, little or nothing was done to enrich the science of plants. At length, all Europe was plunged in ignorance, and Botany lay neglected with every other useful art. On the revival of learning in the fifteenth century, men were solely devoted to the study of the ancients, in order to recover that knowledge which had been so long buried in obscurity. Botanists, therefore, if any there were, searched for plants in the books of the Greeks and Romans. In the sequel, however, they perceived the imperfection and impropriety of such a mode of study. The wide book of Nature lay open before them, and solicited their attention. They sought for plants in the fields. Botany soon wore a more agreeable aspect, and numbers of plants were daily added to the scanty original list. These quickly pointed out the necessity of having recourse to an arrangement, and divisions determined by accurate and distinct characters. Methods were invented, and these in progress of time subdivided into classes, genera and species.

Genera, then, no more than Methods, seem to have been known to the ancients, in the sense in which that term is now generally understood. Every species with them was a genus; and they had no conception of giving a common name to a great number of plants which they could not discover possessed any thing in common: for the reader will observe that the minute parts of the fructification which lay the foundation of most of our boasted systems, were then but little known, and less attended to. In fact, the port or habit of plants, their duration, place of growth, time of flowering,

and their uses both medicinal and æconomical, formerly furnished the sole characters of distinction. Conrad Gesner was the first, who, in 1559, suggested a distinction of plants into genera and species. In his letters to Fabricius, inserted in the third book of his Collection, are the following passages, which may be reckoned decisive on this head. "Generis unius polii species duæ sunt. Novi et alias duas oreofelini species. Existimandum est autem nullas propemodum herbas esse quæ non GENUS aliquod constituent, in duas aut plures species diversas dividendum. Gentianam unam prisca describunt, mihi decem aut plures species notæ sunt." Again, in a letter, dated 1559, he says, "Montana vero illa herba, flore quidem daronici, sed foliis plantaginis, radice aromaticâ, sui omnino GENERIS est. Oblectavit me etiam rarum illud pilosellæ GENUS." And again, "Mihi rara est etiam arthriticæ illa species—Misisti cum reliquis speciem aquifoliæ nullis per marginem foliorum spinis præterquam in mucrone—Lunariam græcam quam phlitteren appellant multam jam hic habemus, sed floribus inodoris: quibus odoratis, GENUS alterum reperiri audio hætenus mihi non visum." Columna, who was posterior to Gesner, entertained the same idea respecting the distribution into genera and species: as did likewise Joachim Jungius, who died in 1657, in whose posthumous works, published in 1679, under the title of *Isagoge Phytoscopica*, is the following passage: "Plantæ, nisi certo in GENERA & SPECIES constanti ratione, non pro lubitu hujus vel illius, redigantur, infinitum quasi reddetur Phytoscopiæ studium; intellectus autem humanus infinitum fugit.—Ordo autem classium, generum, specierum, terminum infinitis prouit."

This doctrine of Conrad Gesner, Columna and Jungius was adopted by succeeding botanists, from Clusius who was contemporary with them, to J. Bauhin. They arranged several species of plants under the same generic name, as iris, narcissus, or willow: but the genera were still vague and undetermined.

In 1655, Morison attempted to establish the genera on a certain foundation, as did likewise the celebrated Ray in

1682, and Rivinus in 1690. The characters, however, which they assigned, were far from being satisfactory or sufficient: and Ray himself was so sensible of their defects, that he afterwards changed his for those of Tournefort.

This illustrious botanist was the first who, in 1694, proposed a satisfactory distribution of the genera, founded on the parts of the fructification, and determined by fixed and precise characters common to several species of plants. A genus of plants, as defined by Tournefort, is an assemblage of several species which agree in all the parts of fructification or the most essential. This is properly what Tournefort calls a primary genus, or genus of the first order. His Secondary Genera will be explained below.

The rules established on this subject by the French botanist, are as follow.

I. The parts of fructification, when present in plants, are solely to be employed as characteristical marks in discriminating the genera, if found sufficient for that purpose.

II. If these marks are found insufficient, recourse must be had to other parts less essential—as the roots, stems, bark, and number of leaves; to the sensible qualities of plants, as their colour and taste; or to their port and external habit.

III. With respect to plants in which the parts of the flower and fruit are wanting, or not to be discovered without the assistance of glasses, the genus is to be fixed from the most remarkable of the characters mentioned in the last paragraph.

IV. All superfluous marks are to be rejected.

V. A greater share of attention is to be paid to the general habit of plants, than to the particular varieties, which can only be discovered by nice and minute observation. Thus, although the large common trefoil, and some other flowers of the same genus, are only furnished with one petal, they are by no means to be separated from the other species, which, like most pea-bloom flowers, have four irregular petals; because they agree with them in more striking characters. Some systematic writers, however, have been absurd enough to advance, that a difference in the number of petals

petals and seeds, is a sufficient foundation for forming different genera from plants otherwise very nearly allied; and, in short, that a flower having only one petal or one seed, can never be referred to the same genus with a flower having two, three, four, or more petals or seeds. The absurdity of this doctrine appears from hence, that, were the rule in question to be strictly followed, we should sometimes refer to different genera, different individuals of the same species. From the seed of papaw, are produced both male and female plants, that is, plants which have male and female flower; on distinct roots. The male flowers have always one petal, the female five. The same thing obtains in the male and female flowers of cassada, which indeed are not placed on distinct roots as the former, but stand apart within different covers on the same plant.

These rules, which are delivered and illustrated at great length in the Preface to the Institutions, led the author to distinguish two sorts of genera, under the appellations of genera of the first order, and genera of the second. The genera of the first order are such as Nature herself appears to have instituted, and accurately distinguished by the flower and fruit; such are violet, ranunculus, aconite, passion-flower, and several others. These are the only genera which Linnæus admits: or, to speak more properly, all the genera of plants are, by this author, rendered primary, whether the characters derived from the parts of the flower and fruit are sufficient for the purpose of discrimination, or not.

The genera of the second order are those, for the distinction of which we must have recourse, not only to the fructification, but to parts that are unconnected with the flower and fruit, by reason of the insufficiency of these last to discriminate the genera of themselves.

Thus, according to Tournefort, germander forms a genus different from poley mountain, *teucrium* and ground pine, on account of its hollow *calyx*, and the disposition of its flowers in the wings or angles of the leaves.—Poley mountain is distinguished from *teucrium*, ground-pine and germander, by its flowers, which are collected in a head or round spike:

teucrium

teucrium from the three others by its bell-shaped *calyx*; and ground-pine by the disposition of its flowers; which proceed singly from the wings of the leaves, and not in whorls or rings, as in germander.

These secondary genera, which Tournefort uses but rarely, are entirely rejected by Linnæus, who has established as a principle in no case to be departed from, that the *generic* characters are to be derived from all the parts of fructification, and none other. A total revolution of the genera must evidently be the consequence of a rigid observance of this principle: and in fact, not the secondary genera of Tournefort only, but many of his primary genera which were established upon the same principle, have felt the effects of this undistinguishing severity. Linnæus's genera, then, contain a description of each particular part of fructification, its various relations, and different modes with respect to number, figure, situation, and proportion.

Thus, all the different species of *calyx*, *corolla*, *nectarium*, *stamina*, &c. considered with respect to the four attributes just mentioned, furnish the observer with so many sensible and essential characters.

These characters the author denominates the letters or alphabet of botany. By studying, comparing, and, as it were, spelling these letters, the student in botany comes, at length, to read and understand the generical characters which the great Creator has originally imprinted upon vegetables: for the genera and species, according to Linnæus, are solely the work of Nature; whilst the classes and orders are a combination of nature and art.

Upon these principles, Linnæus, in his *Genera Plantarum*, determines the generical characters of all the plants there described.—His method will be best illustrated by an example.

NARCISSUS.

CALYX—A *spatha* or sheath, which is oblong, obtuse, compressed, tears open on the side, and withers upon the plant.

COROLLA.

COROLLA—Six *petals*, or rather one *petal* cut almost to the bottom into six parts, which are oval, terminated in a point, flat, and inserted externally above the base of the tube of the *nectarium*, which is situated in the middle of the flower, bell or funnel-shaped, and commonly called the cup.

STAMINA—Six awl-shaped *filaments*, shorter than the *nectarium* and attached to its tube—The *anthers* or *summits* oblong.

PISTILLUM—The *seed-bud* roundish, obtusely triangular and placed under the receptacle of the flower. The *style* thread-shaped, and longer than the *stamina*.—The *stigma* or *summit of the style* divided into three parts, hollow and blunt.

SEED-VESSEL—A *capsule* that is roundish, obtusely three cornered, having three external openings or valves, and the same number of internal divisions or cells.

SEEDS—Numerous, globular, and furnished with an appendage or border. The *receptacle* to which they are fixed is shaped like a pillar.

By this manner of describing all the parts of the fructification, almost innumerable combinations are produced of the botanical letters; I mean the generical characters of plants are multiplied, and furnish an amazing diversity of relations.

Some characters are common to several genera, independently of those which constitute the class and order. Thus snow-drop, greater snow-drop, and sea-daffodil, which belong to the same class and order with narcissus, agree with it not only in the number of the *stamina* and styles which, in the sexual system, lay the foundation of the two primary divisions, but likewise in the form and nature of the *calyx*, which, in all these genera, is a *spatha* or sheath. By comparing the other characters, we discover, in like manner, those which are similar, and those which are distinctive. Thus, in greater snow-drop, the distinctive character is the bell-shaped petal: in snow-drop, the *galanthus* of Linnæus, the three-leaved *nectarium*; and in sea-daffodil, the *nectarium* divided into twelve parts.

It is, as we have said, in the *Genera Plantarum*, that these full descriptions of all the parts of fructification are to be found. In the *Systema Naturæ*, another work of the same author, those characters that are common to all the genera of the same class and order are omitted, and the distinctive characters or generic differences alone are mentioned.—Tournefort, knowing his method to be artificial, did not pretend to assert that his genera were otherwise. Linnæus, however, we have seen, has carried his pretensions further, and affirms that all genera as well as species are natural. What seems to favour this assertion is the striking appearance of the flowers of certain genera, as ranunculus, violet, aconite, fennel-flower, syrian-mallow, passion-flower, and several others which have essential and uniform characters, that, at first sight, seem to entitle them to the appellation of natural genera. But to this it may be answered, that for the comparatively small number of genera which have striking distinctive characters of this kind, there are many, particularly in some natural families, as the umbelliferous plants, lipped, cross-shaped, and pea-bloom flowers, in which the characters in question are so little conspicuous, and the plants so remarkably similar, that one is frequently tempted to make but a single genus of each of these families.

Linnæus has described about twelve hundred and thirty-nine genera, that is, upwards of five hundred more than Tournefort, the number of whose genera amounts, I think, to six hundred and ninety-eight. We must observe, however, that the former frequently incorporates several genera which had been divided by the latter. Such, for instance, are germander, teucrium, mountain-poley, and ground pine, which the French botanist has distinguished, as was observed above, into so many genera of the second order, by characters independent of the fructification. Linnæus, however, employing these characters only for distinguishing the species, and finding essential relations to subsist betwixt the parts of fructification of the Tournefortian genera in question, collects them all under one head; so that instead of
four

four distinct genera, they become as many species of the same genus.

Besides the six hundred and ninety-eight genera of Tournefort, Linnæus's books contain several new genera of other botanists, who lived posterior to Tournefort. The most remarkable of these are, Father Plumier, who established about ninety-six genera of American plants; Boerhaave, who described seventeen new genera; Vaillant, thirty; Dillenius, sixty-seven; Micheli, twenty-seven; Houston, fifteen; Petit, Messieurs de Jussieu, Nissle, Marchant, Danti, Reneaume, Ruppins, Pontedera, Scheuchzer, Buxbaum, Ammannus, Haller, Gmelin, Monti, Gronovius, Mitchel, Catesby, Kæmpfer, &c. have published in all about fifty new genera. The remaining genera, to the number of two hundred and upwards, are published by Linnæus himself.

I conclude this article with a few aphorisms respecting the genera of plants as laid down by Linnæus in his *Philosophia Botanica*.

I. There are few genera in which all the parts of fructification are constant throughout the species.

To this inconstancy is owing the great number of fictitious or spurious genera in Tournefort and other authors: for although such varieties afford excellent specific distinctions, they are not striking enough to constitute real scientific genera. The author very pertinently adds, if genera were to be multiplied in this manner without any necessity, we should soon have as many genera as species, and the science of botany, as far as it respects arrangement, be at an end.

II. If an unnecessary multiplication of the genera is to be avoided on the one hand, an unnecessary reduction of them is no less to be shunned on the other. From the affinity of some genera to classes and orders, we frequently incur the danger of throwing all into confusion, by reducing under one genus a whole natural assemblage or family. Some of the natural orders whose plants have a very similar appearance, were enumerated above. Many plants of the mallow tribe,

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tribe, as mallow, marsh-mallow, holly-hock, lavatera, urena, and Syrian mallow, are of the same kind.

The following parcels of genera, which belong to other natural orders, are very similar in their appearance, and might each, by an inaccurate observer, be confounded under one genus.

House-leek, lesser house-leek, navel-wort, lesser orpine, and tillæa.

Torch-thistle, fig-marigold, aizoon, and tetragonia.

Campion, wild lychnis or agrostemma, viscous campion, carnation, soapwort, cerastium, spurrey, sandwort, moerhingia, and sagina.

In this manner, several natural orders might each be reduced to a single genus, and thus the science be as effectually destroyed by the enormous size of the genera, as formerly by the unnecessary multiplication of their number.

III. A genus may consist of one species only, although it is most commonly composed of a greater number.

The following genera, among many others, consist of only one species :

Grass of Parnassus, tamarind, bastard cumin, sand-box-tree, barren-wort, horn-of-plenty-grass, superb lily, water-leaf, neurada, calligonum, African fly-honey-suckle, least water-plantain, corymbium, cashew-nut, coris, nepenthes, hop, flowering-rush, bastard-indigo, mangostan and orvala.

Other genera, as the following, consist of a great number of species :

Fig-marigold, lesser house-leek, bind-weed, saxifrage, acacia, calves-snout, milk-wort, aster, carex, burning thorny plant, geranium, campanula, viscous campion, wild fenna, St. John's wort, kidney-bean, cud-weed, willow, fig-tree, French honey-suckle, hemp-agrimony, aloe, astragalus, blue-bottle, Syrian mallow, wild orach, flax, ranunculus, gentian, night-shade, thrift, heath, garlick, ox-eye, and cinquefoil.

IV. In many genera, some striking or essential mark of fructification is observed.

Thus the essence of ranunculus consists in its nectarium,
which

which is a small prominence in the claw of each petal: that of self-heal, torenia, eye-bright, mad-wort, and sea-cabbage, in the denticuli or small teeth with which the stamina are furnished: that of martynia, turmeric, bignonia, and chelone, in a pointed body which is placed within the stamina, and resembles a filament without its anther: that of hellebore and fennel-flower, in its numerous hollow *nectaria*: that of water-leaf, in its closed chinks, (*rimæ clausæ*) within the divisions of the petal: that of henbane, in the covering of its seed-vessel, by which it is distinguished from alkekengi: that of sea-daffodil, in the insertion of its stamina into the upper part of the nectarium, by which it is distinguished from narcissus, where the stamina are placed within the nectarium, and affixed to its tube: that of bastard-rocket, and bell-flower, in their nectarium: lastly, that of iris, in its singular *stigma*, which resembles three petals, or leaves.

V. The striking or singular characteristical mark of every genus must run through all the species. Without a strict attention to this rule, we might be apt to confound genera that should be distinguished. It was for want of this caution that aloe and American aloe were formerly incorporated into one genus; as were likewise ranunculus and adonis, andromeda and heath.

Aloe is now separated from American aloe, (*Agave*) because its stamina are inserted, not into the petals, but into the common receptacle; adonis from ranunculus, because it wants the prominence in the claw of the petal, which is the distinguishing mark of the latter; andromeda from heath, because of the two horns of the anthers, which are more conspicuous in the latter than the former.

VI. Plants which are of the same genus, possess like medicinal powers. The truth of this aphorism will be best illustrated by attending to the following list of *congeneres*.

Scammony, turbith, jalap, and sea bind-weed belong to the genus *convolvulus*.

Moly, leek, onion, and garlick, belong to the genus *allium*.

Cinnamon, camphire, benjamin-tree, sassafras, and avocado pear, belong to the genus *laurus*.

Southernwood

Southernwood and wormwood belong to the genus *artemisia*.

GENUS *sumum*, a term used by Rivinus and Ray, synonymous to CLASSIS in Linnæus, and ORDO in Tournefort.

GENUS *subalternum*, another term used by the same botanists, synonymous to ORDO in Linnæus, and SECTIO in Tournefort.

GERMEN, the seed bud; defined by Linnæus to be the base of the pistillum, which contains the rudiments of the seed, and, in progress of vegetation, swells and becomes the seed-vessel.

When the seed-bud is placed above the receptacle, or, in other words, within the cover or covers of the flower, it is termed *germen superum*; when situated below the receptacle, or under the calyx, *germen inferum*. The former, which corresponds to *flos inferus*, is exemplified in sumach, *hippuris*, *wachendorfia*, *commelina*, *xylis*, and the grasses;—the latter, synonymous with *flos superus*, in valerian, iris, *gladiolus*, *epilobium*, *cænothera*, *viburnum*, elder, and the umbelliferous and cucurbitaceous plants.

In assimilating the vegetable and animal kingdoms, Linnæus denominates the seed-bud the *ovarium* or *uterus* of plants, and affirms its existence to be chiefly at the time of the dispersion of the male-dust by the anthers; as, after its impregnation, it becomes a seed-vessel.

GERMEN, by Pliny and the ancient botanists, is used to signify a bud containing the rudiments of the leaves. *Vide GEMMA*.

GERMINATIO, comprehends the precise time which the seeds take to rise after they have been committed to the soil.

The different species of seeds take longer or shorter time in rising, according to the degree of heat which is proper for each. Millet, wheat, and several of the grasses, rise in one day; blite, spinach, bean, mustard, kidney-bean, turnip, and rocket, in three days; lettuce and dill, in four; cucumber, gourd, melon, and cress, in five; radish and
beet,

beet, in six; barley, in seven; orach, in eight; purslane, in nine; cabbage, in ten; hyssop, in thirty; parsley, in forty or fifty days; peach, almond, walnut, chefnut, pæony, horned poppy, hypecoum, and ranunculus falcatus, in one year; rose-bush, cornel-tree, hawthorn, medlar, and hazel-nut, in two. The seeds of some species of orchis, and of some liliaceous plants, never rise at all. Of seeds, some require to be sowed almost as soon as they are ripe, as otherwise they will not germinate. Of this kind are the seeds of coffee and fraxinella. Others, particularly those of the pea-bloom flowers, preserve their germinating faculty for a series of years.—M. Adanson asserts, that the sensitive plant retains that virtue for thirty or forty years.

Air and water are the agents of germination. The humidity of the air alone makes several seeds to rise that are exposed to it. Seeds too are observed to rise in water, without the intervention of earth: but water, without air, is insufficient.—Mr. Homberg's experiments on this head are decisive. He put several seeds under the exhausted receiver of an air-pump, with a view to establish something certain on the causes of germination. Some of them did not rise at all; and the greater part of those which did, made very weak and feeble productions.

Thus it is for want of air, that seeds which are buried at a very great depth in the earth, either thrive but indifferently, or do not rise at all.

They frequently preserve, however, their germinating virtue for many years, within the bowels of the earth; and it is not unusual, upon a piece of ground being newly dug to a considerable depth, to observe it soon after covered with several plants, which had not been seen there in the memory of man.

Were this precaution frequently repeated, it would doubtless be the means of recovering certain species of plants which are regarded as lost; or which, perhaps, never coming to the knowledge of botanists, might hence appear the result of a new creation.

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Some seeds require a greater quantity of air than others. Thus purslane, which does not rise till after lettuce in the free air, rises before it in vacuo; and both prosper but little, or perish altogether, whilst cresses vegetate as freely as in the open air.

GLANDULA, a species of secretory or excretory vessel that is found on the surface of some plants.

Glands are seated either on the footstalks, on different parts of the leaves, or on the tender stipulæ. They resemble sometimes a blister or bladder, as in St. John's wort; sometimes a number of scales, as in fern; sometimes several small grains like millet, as in fir-tree; at other times a little cup, as in apricot-tree; sometimes too they appear by a microscope to be supported by footstalks; and often to be seated upon the leaves without any footstalk.

All these bodies appear to be produced by the swelling of some portion of the cellular or parenchymatous substance. From many of them oozes a viscous liquor, which, drying upon the plant, forms a fine white powder, and a number of slender threads, that are frequently to be seen surrounding the glands in question. Hence it has been concluded that they are the organs of some secretion; but it is not yet ascertained, whether that is their sole function.

In palma christi, cassava, passion-flower, wild senna, and acacia, the glands are seated on the footstalks.

In willow-tree they are placed on the indented or sawed margin of the leaves: in almond-tree, gourd, heliocarpus, balsam, gelder-rose, and bird-cherry, they proceed from the base of the leaf: in urena, tamarisk, and bastard ricinus, from its back; in butter-wort and sun-dew, from the upper surface.

In mountain ebony and apricot-tree, the glands are seated upon the tender stipulæ or scales which surround the young footstalks of the flower and leaves.

The glands in currant-tree, a species of calve's snout, cerasium, fig-wort, and viscous campion, are slender like hairs, and are hence denominated *glandulæ capillares*.

The pores or small holes observable on the surface of some plants,

plants, as tamarisk, and a species of viscous campion, are reduced by Linnæus under the term *glandulæ* which we are now considering.

The glands furnish excellent characteristic marks for discriminating the species of plants. Thus the almond-tree can scarce be distinguished from the peach, but by its glands, which are seated at the base of the leaves, upon the serratures: whereas, in the peach-tree, there is no appearance of this kind. A species of convolvulus with a pimpled or knotty calyx, is so variable in the shape of the leaves, as to justify its division into several species; yet it is kept entire by the constancy of the glands, which are placed upon the leaves. In a species of monarda, the petal is covered over with glands; an appearance which evidently distinguishes it from all the plants of the same genus.

The prickles of *baubinia aculeata* are covered with glands of the same kind.

A glandular appearance is frequently to be observed betwixt the stamina of some plants, particularly in the cross-shaped flowers, (*Tetradynamia*) in which Linnæus reckons it an essential classical character.

GLANDULATIO, from *glandula*, a term respecting the vessels of secretion in plants, which are, by Linnæus, reckoned three: viz. GLANDULÆ, FOLLICULI and UTRICULI.

GLUMA, a husk; the calyx of the grasses, composed of one, two, or three valves, a kind of scales commonly transparent in the margin, and most frequently terminated by a pointed thread termed the *arista*, or beard. *Vide GRAMINA et ARISTA.*

GLUMOSUS *Flos*, a species of aggregate flower so called, which has a slender thread-shaped receptacle, along which are placed a number of florets or partial flowers; the base being furnished with a common husky calyx, termed by Linnæus *gluma*. Of this kind are bromus, fescue grass, oats, reed, poa, wheat, and other grasses.

GLUMOSÆ, the name of a class in Linnæus's *Methodus Calycina* and Wachendorffius's Natural Method, consisting of

of plants which have that particular species of calyx called a gluma or husk.—It contains all the natural order of the grasses.

GLUTINOSITAS, from *gluten*, glue; a term occurring in the *Delineatio Plantæ* prefixed to the *Systema Naturæ*, and placed under the general head *pubes*; it seems to denote that stiff clammy matter which is sometimes found on the surface of the leaves and stalks of plants.

GRAMINA, grasses; one of the seven tribes or natural families, into which all vegetables are distributed by Linnæus in his *Philosophia Botanica*. They are defined to be plants which have very simple leaves, a jointed stem, a husky calyx termed *gluma*, and a single seed. This description includes the several sorts of corn as well as grasses. In Tournefort they constitute a part of the fifteenth class, termed *apetali*; and in Linnæus's Sexual Method, they are mostly contained in the second order of the third class, called *triandria digynia*.

This numerous and natural family of the grasses, has engaged the attention and researches of several eminent botanists. The principal of these are, Ray, Monti, Micheli and Linnæus.

Giuseppe Monti, in his *Catalogus Stirpium agri Bononiensis*, *gramina ac hujusmodi affinia complectens*, printed at Bologna, in 1719, divides the grasses from the disposition of their flowers, as Theophrastus and Ray had divided them before him, into three sections or orders.—These are,

SECTION I.

Grasses having flowers collected in a spike.

SECTION II.

Grasses having their flowers collected in a panicle or loose spike.

SECTION III.

Plants that in their habit and external appearance are allied to the grasses.

This class would have been natural, if the author had not

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improperly introduced sweet-rush, juncus, and arrow-headed gráßs into the third section. Monti enumerates about 306 species of the grasses, which he reduces under Tournefort's genera; to these he has added three new genera.

Scheuchzer, in his *Agrostographia, seu Graminum, Juncorum, Cyperorum et Cyperoidum iisque affinium historia*, published likewise in 1719, divides the grasses, as Monti, from the disposition of their flowers, into the five following sections:

SECTION I.

Grasses with flowers in a spike, as phalaris, anthoxanthum and frumentum.

SECTION II.

Irregular grasses, as schœnanthus and cornucopiæ.

SECTION III.

Grasses with flowers growing in a simple panicle or loose spike, as reed and millet.

SECTION IV.

Grasses with flowers growing in a compound panicle or diffused spike, as oats and poa.

SECTION V.

Plants by their habit nearly allied to the grasses, as cypress-grass, scirpus, linagrostis, rush and scheuchzeria.

Scheuchzer has enumerated about four hundred species, which he describes with amazing exactness.

Micheli has divided the grasses into six sections, which contain in all forty-four genera, and are arranged from the situation and number of the flowers.

GRAMINA. The name of the fourth order in Linnæus's *Fragments of a Natural Method*, consisting of the extensive natural family of the grasses.

G R A S S E S

List of Genera contained in this Natural Order.

SECTION I.

Grasses having Hermaphrodite Flowers.

Linnæan Genera.		English Names.
<i>Agrostis,</i>	—	Bent-Grass.
<i>Aira,</i>	—	Hair-Grass.
<i>Alopecurus,</i>	—	Fox-tail grass.
<i>Anthoxanthum,</i>	—	Vernal grass.
<i>Aristida.</i>		
<i>Arundo,</i>	—	Reed.
<i>Avena,</i>	—	Oats.
<i>Bobartia.</i>		
<i>Briza,</i>	—	Quaking grass.
<i>Bromus,</i>	—	Brome grass.
<i>Cinna.</i>		
<i>Cornucopiæ,</i>	—	Horn-of-plenty grass.
<i>Cynosurus,</i>	—	Dog's-tail grass.
<i>Dactylis,</i>	—	Cock's-foot grass.
<i>Elymus.</i>		
<i>Festuca,</i>	—	Fescue-grass.
<i>Hordeum,</i>	—	Barley.
<i>Lagurus,</i>	—	Hare's-tail grass.
<i>Lolium,</i>	—	Darnel.
<i>Lygeum,</i>	—	Hooded matweed.
<i>Melica.</i>		
<i>Milium,</i>	—	Millet.
<i>Nardus.</i>		
<i>Oryza,</i>	—	Rice.
<i>Panicum,</i>	—	Panic-grass.
<i>Paspalum.</i>		
<i>Phalaris,</i>	—	Canary-grass.
<i>Phleum,</i>	—	Cat's-tail grass.
<i>Poa,</i>	—	Meadow grass.
<i>Saccharum,</i>	—	Sugar-cane.

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Linnæan Genera.		English Names.
<i>Secale</i> ,	—	Rye.
<i>Stipa</i> ,	—	Winged spike-grafs.
<i>Triticum</i> ,	—	Wheat.
<i>Uniola</i> ,	—	Sea-side oats of Carolina.

SECTION II.

Graffes having Male and Female Flowers upon the same Root.

Linnæan Genera.		English Names.
<i>Coix</i> ,	—	Job's tears.
<i>Olyra</i> .		
<i>Pharus</i> .		
<i>Tripsacum</i> .		
<i>Zea</i> ,	—	Indian, or Turkey wheat, Indian corn.
<i>Zizania</i> .		

SECTION III.

Graffes with Hermaphrodite and Male Flowers on the same Root.

Linnæan Genera.		English Names.
<i>Aegilops</i> ,	—	Wild fescue-grafs.
<i>Andropogon</i> .		
<i>Apluda</i> .		
<i>Cenchrus</i> .		
<i>Holcus</i> ,	—	Indian millet.
<i>Ischæmum</i> .		

Habit and Structure of the Plants of this Order.

Most of these plants are annual or perennial herbs; some of them are erect, others creep upon the ground.

The ROOTS, in the greatest number, creep, and emit fibres

fibres from each knot or joint : in others, they are simply branched and fibrous.

The STEMS and branches are round.

The LEAVES are simple, alternate, entire, very long, and commonly narrow. They are generally placed immediately upon the stem, except in bamboo, pharus, a new species of reed called *guioraat senegal*, and a species of *Ischæmum*, which have a foot-stalk at the origin of the leaves.

The leaves form below a sort of sheath, which embraces the stem, and is generally cleft on one side through its whole length. In two species of melica, mentioned by M. Adanson, the sheath in question is perfectly entire.

The top of the sheath is sometimes crowned with a membrane, that is either cleft or entire, and is frequently accompanied with two appendages or ears, as in rice, pharus, darnel, wheat, rye, and barley. In others, the sheath is crowned with hairs, as in millet, panic-grafs, and andropogon; and in some species of panic-grafs it is naked; that is, has neither membrane nor hairs.

The FLOWERS are hermaphrodite in plants of the first section; male and female upon the same root in those of the second; hermaphrodite and male on the same root in those of the third.

They proceed either singly from the sheath of the leaves, as in lygeum; form a single spike, as in nardus and darnel; or are formed into a panicle, that is, loose spike, as in poa, agrestis, and oats.

The CALYX and COROLLA in this order, are not sufficiently ascertained. In some, a single scale or husk, in others two, as in nardus, supply the place of both covers; some grasses, as canary-grafs, and phleum, have four husky scales, two of which serve for the calyx, and the other two for the corolla; some have five, as anthoxanthum; others six, as rice, four of which are supposed to constitute the calyx, and the other two are termed, improperly enough, the husky petals.

The corolla is sometimes composed of one petal with two divisions,

divisions, as in fox-tail grass. In general, the husks of the calyx are placed opposite to those of the corolla.

Besides the husky scales that have been mentioned, there are two other small square scales, placed by each other, betwixt the seed-bud and the external husk of the corolla.

These scales are not always to be seen without the assistance of a magnifying glass; and in some, as panic-grass and cénchrus, they are entirely wanting. Lastly, the calyx and corolla, if indeed they are to be considered as distinct covers, are frequently accompanied with an arista or sharp-headed awn, which sometimes terminates the husk, sometimes proceeds from the middle or base of its back. In oats, wheat and barley, these sharp beards are frequently made to disappear by culture. Some grasses have, besides the calyx, a cover which accompanies or surrounds the flowers under the form of a scale, and is variously cut, and of a very different figure from that of the leaves.

The calyx and corolla, or rather the husky scales which resemble them, always accompany the seed-bud to its maturity. Upon the whole, I am of opinion, that former botanists were not greatly mistaken, when they denominated the grasses *plantæ apetalæ*, plants which want petals; as the husky scales are, perhaps, with much more propriety, to be denominated a calyx.

The STAMINA are generally three in number, and placed irregularly, with respect to the situation of the calyx and the corolla. One stamen is commonly placed betwixt the seed-bud and the two small scales or external husk of the corolla; and two betwixt the seed-bud and the inner husk. Rice, zizania; and pharus, have six stamina.

The ANTHERS are long, furnished with two cells, and slightly attached to the filaments.

The SEED-BUD is placed upon the same receptacle as the calyx, corolla and stamina. In bobartia it is said to be placed under the receptacle of the flower.

The STYLE is generally double, and crowned with a hairy *stigma* or summit.

The

The SEED-VESSEL in this order is wanting.

The SEEDS are single, oval, and attached below to the bottom of the flower.

The roots of the grasses are aperient; such as have an aromatic smell are stomachic; their seeds are mealy, mucilaginous and nourishing.

All the parts of these plants are wholesome. The leaves of such as are not too rough to the touch, are browsed upon by animals; the large seeds, as of wheat, rye, barley, oats, &c. are daily converted into food for men; the smaller seeds, as of canary-grass, and panic-grass, afford a very excellent repast to sparrows and other birds; and, in times of scarcity, the tuberous roots of some of the esculent grasses are no bad succedaneum, in default of their seeds.

Of a species of reed, which grows plentifully in Syria and Palestine, the Turks make their writing pens.

The stalks of *arundo donax* are used for fishing-rods.

There are two sorts of reed, says Haffelquist, which grow near the Nile: one of them has scarce any branches, but is furnished with numerous leaves, that are narrow, smooth, and channeled on the upper surface; and the plant is about eleven feet high. The Egyptians make ropes of the leaves. They lay them in water like hemp, and then make them into good strong cables. These, with the bark of the date-tree, are almost the only cable used in the Nile. The other sort is of great consequence. It is a small reed, about two or three feet high, full branched, with short, sharp, lancet-shaped leaves. The roots, which are as thick as the stem, creep and mat themselves together to a considerable distance. This plant seems useless in common life; but to it, continues the learned author, is the very soil of Egypt owing: for the matted roots have stopped the earth, which floated in the waters; and thus formed out of the sea, a country that is habitable.

Bamboo Cane, the *Arundo Bambos* of Linnæus, the *Ily* or *Ili* of the *Hortus Malabaricus*, grows naturally in sandy places; and on the banks of rivers in both Indies, where it frequently attains a height exceeding even that of the

cocoa-

cocoa-tree. The root is not very different from the stem, unless that it is of a whitish colour, and consists of several radicles or fibres. From the joints of the main root are emitted small jointed stalks, which again emit others from their joints; and from these, as from so many new roots, arise several stalks joined together, which being planted with their radicles, or string roots, serve to perpetuate the species. These stalks are round, have a green bark, are hard, emit from the joints new branches and twigs, and are armed in the joints themselves with one, two, or more rigid and acute thorns of an oblong figure. It is to be observed, however, that the stalks in question, arising, as we have said, immediately from the root, have attained in their native soil the height of two or three men, and the thickness of almost a span, before they send forth any lateral branches. These, when young and tender, are nearly solid, pervious only in the middle by a small tube. The older stalks and branches are hollow within, being shut, however, at the joints with a woody partition, and covered internally with a slender whitish membrane that is composed of hard, white, woody filaments. The colour of the stalks, when young, is a brownish green; when older, a shining yellow with a shade of white. The leaves are long, narrow, seated on short footstalks, streaked with longitudinal veins, and rough on the edges, if rubbed downwards. The flowers grow in long scaly spikes, which proceed in great numbers from the joints of the stalks. Rheede mentions a tradition prevailing on the coast of Malabar, that the bamboo vegetates till its sixtieth year; at which period of its growth, and nearly a month before the flowers emerge from their scaly covers, the tree is divested of all its leaves, and after it has ceased to flower, immediately dies. This tree or reed is termed by the inhabitants of Ceylon, UNAGHAS, that is, Fever-tree, from an opinion generally entertained in that island, that a fever is the certain consequence of bathing in any river into which the flowers or leaves of the bamboo have fallen. By the Arabians it is named Tabaxir, as is likewise a milky humour or sugar produced in it. The
Indians

Indians call it Mambu ; whence vulgarly and by corruption, its European name of Bambu, or Bamboo. In the island of Madagascar, and particularly in the province of Galem-boulou, by the testimony of Flacourt, it is produced in such abundance, as to give name to the province ; for in those parts it is termed Voulu. The size of this tree in India is generally so great, that houses are built of it. In the porch of the Academical Garden at Leyden are suspended some fragments, a present of the celebrated Piso, the largest of which exceeds twenty-eight, the least twenty-six feet in length. That they must, however, have been double that size before they were broken off, appears probable from this circumstance, that the thickness of one extremity scarce differs from that of the other. It is likewise wonderful, that so immense a reed should be clothed with so very small leaves ; the largest of the dried ones in the collection of Professor Syens at Leyden, mentioned by Rheede in his *Hortus Malabaricus*, scarcely exceeding a span in length, or the breadth of a finger in width. The stalks, when old, are entirely covered in the cavity with a sort of calx, which is esteemed useful in the strangury, and to such as are troubled with purulent urine. Bamboo, being burnt, affords very fertile ashes, in which plants of all kinds thrive remarkably. Whilst burning, the stalks emit a very loud explosion ; the air contained in their cavity being rarified by the heat, and desiring a larger space, breaks through the partitions at the joints, and violently seeks a passage whereby to escape. Kæmpfer relates, in the *Amœnitates Exoticæ*, that in a province of Japan, called Oomi, which has a slimy bottom, the roots of bamboo luxuriate with such wonderful beauty, that, being dug out of the ground, and disentangled from the strings which encompass them, they serve, as the stalks with us, for walking sticks, commonly called Rotang. From this curious reed several conveniences are obtained, besides those which have been mentioned. In particular, the natives of India, of the stems of the Bamboo, make most of their common utensils. The reader is referred for a more minute detail, to the *Mantissa Aromatica* of Piso, where, besides a very accurate description of the Tabaxir

or Sugar, mentioned above, he will also learn, that the tender branches or twigs, particularly those near the root, being macerated in salt and vinegar, afford, with the addition of garlick, and the pods of capsicum, a sort of pickle, which is esteemed excellent, and constitutes not the least valuable part of those famous *condita*, commonly termed Achar, and Atsjaar, and well known in Europe for exciting the appetite, and promoting digestion.

Mr. Ray, in his "Wisdom of God in the Creation," justly observes, that it is no small instance of the great Creator's goodness, that wheat, and the most common corn used for food, should be the growth of most parts of Europe and Asia. It is likewise no less worthy observation, that, where the soil under the Torrid Zone is too hot to produce wheat, the same divine wisdom hath appointed other kinds of corn to grow and ripen there in great plenty. Thus, in Africa and the West Indies, this want is supplied by Indian and Guinea corn: and, in some places, where the excessive heat of the climate renders labour and the cultivation of corn painful, there bountiful Providence, with an unsparing hand, ordains food without labour, by causing banana and plantain trees to grow in great plenty, whose fruit is, by many persons, preferred to any kind of bread whatsoever.

The stalk and panicle of Job's tears much resemble those of Guinea corn; and the seeds, which are inclosed in small capsules, are about the bigness of an English pea, and of different colours. These are strung upon silk, and used instead of bracelets by some of the poorer sort in the West Indies, but especially by the negroes. In a scarcity of corn, the poor people in Spain and Portugal grind the seeds to flour, of which they make a coarse sort of bread.

Rice is greatly esteemed in most of the eastern countries, where it is the chief support of the inhabitants. The plant bears a stalk about three or four feet high, much stronger and thicker than that of wheat or other corn. The leaves are long like the reed, and fleshy; the flowers blow on the top like barley; but the seed which follows is disposed in clusters, each of which is enclosed in a yellow husk ending in a spiral thread. The seed is oblong, or rather oval and white.

white. The plant is cultivated in moist or low grounds in Italy, and the seed brought dry from Piedmont, Spain, and several other places.

Rice is the chief commodity and riches of Damietta, in Egypt. Dr. Hasselquist thus describes the manner in which they dress it, and decorticate, that is, separate it from the husk. It is pounded by hollow iron pestles of a cylindric form, an inch in diameter, lifted up by a wheel worked by oxen. A person sitting between the two pestles pushes forward the rice, when the pestles are rising; another sifts, winnows, and lays it under the pestles. In this manner they continue working it, until it is entirely free from chaff and husks. When clean, they add a thirtieth part of salt, and pound them together; by which the rice, formerly grey, becomes white. After this fining, it is passed through a fine sieve, to part the salt from the rice; and then it is ready for sale. Damietta sells every year sixty thousand sacks of rice, the greatest part of which goes to Turkey, some to Leghorn, Marseilles and Venice.

Guinea corn is the *miliun arundinaceum* of Caspar Bauhin, the *holcus sorghum* of Linnæus. The stalks are large and compact, and full eight feet high. In Senegal the fields are entirely covered with it. The Negroes, who call it *guiarnot*, cover the ears when ripe with its own leaves, to shelter it from the sparrows, which are very mischievous in that country. The grain made into bread, or otherwise used, is esteemed very wholesome. It is with this that the slaves in the West Indies are generally fed, each being allowed from a pint to a quart every day. The juice of the stalks is so agreeably luscious, that, if prepared as the sugar-canes, they would afford an excellent sugar.

The Negroes on the coast of Guinea, make of two sorts of millet, a thick grained pap, called *couscous*, which is their common food.

The sugar-cane grows naturally in both Indies, where it is likewise cultivated for its juice, which, when boiled, affords that sweet substance called sugar.

In the manner of their growth, form of their leaves, and
make

make of their panicle, the sugar-canes resemble the reeds which grow in wet marshy grounds in England, or elsewhere, except that the canes are far larger, and, instead of being hollow, as the reeds, are filled with a white pith, containing the sweet juice or liquid which stamps such an amazing value upon these plants. The intermediate distance between the joints of a cane is of different lengths, according to the nature of the soil, richness of the manure, and temperature of the weather during its growth; it seldom exceeds, however, four inches in length, and an inch in diameter. The length of the whole cane likewise depends upon the above circumstances. It generally grows to perfection in about fourteen months, when its height, at a medium, is about six feet, sometimes more, sometimes less. The body of the cane is strong, but brittle; of a fine straw-colour inclining to a yellow. The extremity of each is covered, for a considerable length, with many long grassy leaves or blades, sharply and finely sawed on their edges; the middle longitudinal rib being high and prominent.

The bottom part of the sugar-cane top, is about the thickness of one's finger; and as it contains a good deal of the natural sweetness of the plant, it is usually cut into pieces of an inch and a half long, and given to the saddle-horses in the West Indies. It is very nourishing food, and fattens them apace. The mill-horses, mules, and asses, are likewise fed, during crop-time, on sugar-cane tops, and the skimming of the sugar-coppers; which last must be administered sparingly at first, for fear of griping, and, perhaps, killing them.

The canes, when ripe, are squeezed between the iron-cased rollers of wind-mills, or cattle-mills. The juice thus pressed out is boiled first in a very large copper or cauldron, being mixed with a very small quantity of lime. In default of lime, a strong ley of ashes will answer the same purpose, and was indeed originally used, though the first is generally thought to have greater efficacy. The benefits arising from either substance are probably to be attributed, in a great measure, to their alkaline qualities.

The

The sugar-cane, when ripe, is of all plants the sweetest; there is, however, a latent acid still lurking in the juice; as is manifest, by its turning sour, if suffered to remain un-boiled any considerable time after expression. The addition, therefore, of white lime, which the planters call *temper*, is necessary to destroy, in a great measure, the remaining acid, and to form a neutral salt.

Lime, or the strong ley just mentioned, likewise serves to carry off all impurities from the liquor. When the quantity of *temper* is duly proportioned, if the liquor is put into a glass, an immediate separation will follow; the *sordes* settle at the bottom, the juice remains transparent at top. On the other hand, if there is a deficiency of *temper*, the separation will be imperfect; and if there is a superfluity, there will be no separation at all.

After the lime is mixed with the juice in the copper or cauldron, the impurities in question being no longer intimately united with the boiling liquor, and being forced about with the heat of the fire, are easily entangled in a viscous tough substance, naturally in the cane-juice, with which they rise to the top of the copper, forming a thick tough scum.

The clarification of the liquor, as far as is done in the first copper, is perfected after the more gross scum is taken off; the remaining impurity, as the liquor boils, is skimmed off from the four or five remaining coppers, into which the liquor is successively poured; each of the coppers being gradually less, as containing a less quantity of liquor.

In its passage to the fourth copper, the liquor is strained through a thick woollen cloth, where it leaves all the remaining impurities that had escaped the scummer.

After this a light white scum is taken off; and, when this ceases to arise in any considerable quantity, and the liquor, by long boiling, becomes more of a syrup than a thin liquid, it is then poured into the first tache, and from this to a lesser, till it is conveyed to the last. When it has here attained the due consistence necessary to become sugar, it may be asserted, says Hughes, from whom this account is

chiefly extracted; that no more than a seventh part of the whole remains; which diminution is occasioned by the impurities being scummed off, and the watery particles evaporated.

From this last stage it is conveyed, whilst of the consistency of a thick granulated syrup, into a large brass cooler, where it shoots into crystals, which are the genuine and essential salts of the plant; these are forwarded by gently stirring the whole mass, by which means the air is admitted to every part, and the particles of sugar disengage themselves from the clammy substance, which is termed melasses.

When it has grained or crystallized, it is removed from the cooler into pots or moulds, which are earthen, and of a pyramidal form, containing from eight to thirteen gallons.

About twenty-four hours after the sugar is potted, the small round hole in the bottom of each pot is unstopped, and the pots put upon earthen jars, containing about four gallons each. Into these vessels, the melasses drain from the sugar, which, in this degree of perfection, is called muscavado, and is fit for exportation in a month or sooner.

From the abovementioned skimmings, mixed with a quantity of water and melasses, and fermented, is extracted that spiritous liquor called rum; and from the great quantity of oil in the cane-juice, which is transmitted in abundance to the rum, proceeds the excellency of that spirit compared with brandy. The latter wanting this oiliness, stimulates and lacerates the coats of the stomach; whereas the former, if meliorated by age, and drunk moderately, serves, by its oiliness, to lubricate and preserve the bowels.

The most natural, and perhaps the only proper method of producing canes, is by suckers, or with the tender tops of old canes. These being cut into pieces of about a foot long, planted in holes of about six inches deep, and two feet wide, and covered with good manure, will produce each from its roots a great number of canes.

GRAMINIBUS *affines*, the name of a class in Haller's natural method, consisting of plants, which, like rush,
cane,

carex, and cyperus, seem nearly allied to the family of the grasses.

GRAMINIFOLIÆ, from *gramen*, grass, and *folium*, a leaf; the name of a class in Ray's *Methodus Propria*, consisting of plants which have leaves like those of the grasses. It is exemplified in scirpus and cyperus.

GRUINALES, from *grus*, a crane; the name of the fourteenth order in Linnæus's *Fragments of a Natural Method*, consisting of geranium, vulgarly called crane's bill, and a few other genera, which the author considers as allied to it in their habit and external structure.

The title was probably derived from a genus of Rivinus of the same name, which Linnæus has added to the genus geranium.

List of the Genera contained in this Order.

Linnæan Genera.			English Names.
<i>Aldrovanda.</i>			
<i>Averrhoa.</i>			
<i>Drosera,</i>	—	—	Sundew.
<i>Fagonia.</i>			
<i>Geranium,</i>	—	—	Crane's bill.
<i>Guaiacum,</i>	—	—	Lignum vitæ, or pockwood.
<i>Linum,</i>	—	—	Flax.
<i>Oxalis,</i>	—	—	Wood-forrel.
<i>Quassia.</i>			
<i>Tribulus,</i>	—	—	Caltrops.
<i>Zygophyllum,</i>	—	—	Bean-caper.

Habit and Structure of the Plants of this Order.

This order furnishes both herbaceous and woody plants.

The ROOTS are sometimes fibrous, sometimes tuberous. In some species of wood-forrel they are jointed.

The STEMS are cylindric. The young branches, in some, nearly square.

The BUDS are of a conic form, and covered with scales.

The LEAVES are either simple, as in geranium; or compound, as in *lignum vitæ* and caltrops. In bean caper, they consist of one pair of *pinnae* or wings only; in *lignum vitæ*, from two to five pair; and in caltrops, from three to eight, placed opposite. In *fagonia* the leaves are finger-shaped, each leaf being composed of three lobes or lesser leaves.

The lower leaves of most of the geraniums are commonly alternate; the upper ones are opposite, one of the two being larger than the other.

The STIPULÆ or scales in the European geraniums surround the footstalks of the lower leaves, and fall with them. In the African species, all the leaves, both upper and lower, have supports of the same kind, which are sometimes united at the base, so as to have the appearance of a single stipula. The scales which accompany the leaves at the top of the branches of the European geraniums, fall off very early. Wood-forrel bears *stipulæ* on its footstalk, precisely at the joints.

The FLOWERS are hermaphrodite.

They proceed from the wings of the leaves, either singly, as in guaiacum, flax, aldrovanda, and fagonia; or in clusters, as in some species of geranium and wood-forrel.

In sundew they terminate the branches in a spike: and in bean caper, they are produced either singly, or two by two, along the branches, without the angles or wings of the leaves.

The CALYX or FLOWER-CUP consists either of five distinct leaves, as in most of the geraniums, flax, and bean-caper; or of one leaf divided almost to the bottom into five parts, as in aldrovanda and sundew; it generally accompanies the seed-bud to its maturity. In fagonia, the calyx, which is composed of five leaves, falls with the petals, and the other parts of the flower.

The PETALS are five in number, spread, and are frequently funnel-shaped. In the different species of geranium, the

the figure of the petals is different, as is likewise their number. In *aldrovanda*, the petals, as well as the calyx, are permanent.

The NECTARIUM in bean-caper and quassia, consists of a number of small leaves or scales, which are inserted into the inside of the base of the filaments, and surround the seed-bud. These scales, in the former, are ten in number, one for each filament: in the latter, they are hairy, and but five in number.

The STAMINA are generally ten in number, awl-shaped, erect, and of the length of the petals. In *averrhoa* and *geranium* they are alternately long and short. The filaments in some of the *geraniums* are united below; in others, distinct.

In flax, *aldrovanda*, and sun-dew, there are but five stamina; the first, however, besides its five perfect stamina, has five other bodies resembling stamina without tops, which are placed alternate with the former. Nay, in a particular species, called *linum lusitanicum*, there are ten perfect stamina.

The ANTHERS or tops of the stamina are generally oblong, and frequently attached to the filaments by the middle, so as to lie and sometimes to veer about upon them. In flax, the anthers are arrow-shaped. Their number is not constant in the different species of *geranium*: some have ten, some seven, and others five.

The SEED-BUD is either oblong, or five cornered.

The number of *styles* is either one, as in bean-caper, quassia, and *lagonia*; or five, as in *aldrovanda*, wood-sorrel, and flax. In *tribulus* the style is wanting.

The SEED-VESSEL is generally a five-cornered capsule, with one, three, five, or ten cells. In *averrhoa*, the seed-vessel is of the apple-kind, shaped like a top, with five angles, and the same number of cells. *Quassia* and *tribulus* have five different fruits or seed-vessels, which, in the former, are egg-shaped, and inserted into a large round fleshy receptacle. In a species of *tribulus*, the *cistoides* of Tournefort, the number of fruits is ten.

G R U

The SEEDS are generally equal in number to the internal divisions or cells of the seed vessel; one seed being placed in each cell. In geranium, the seeds, which are five in number, and kidney-shaped, are commonly wrapped in the proper coat or covering, called by Linnæus, *arillus*, and terminated by a spiral beard or haulm. In wood-forrel, the seeds are dispersed with an elastic spring.

Flax, with respect to its virtues and uses in medicine, is bitter, mucilaginous, purgative, and used in inflammations.

Geranium is vulnerary and astringent.

The leaves of wood-forrel, boiled in broth, are said to be serviceable in putrid fevers.

The leaves of *geranium zonale* are marked with a purple circle like a horse-shoe, which reaches from one side of the base to the other, and corresponds with the border of the leaf. When gently rubbed, they have a scent like scalded apples.

The flowers of *geranium triste* are marked with dark purple spots, and smell very sweet after the sun has left them; hence the species is known among gardeners by the name of night-scented crane's-bill. In general, it may be observed, that most species of geranium with tuberous fleshy roots have their odour augmented in the evening, and during the absence of the sun.

Guaiacum, or holy-wood, grows plentifully both in the East and West Indies, and is brought to us in large long billets or logs, some of which weigh four or five hundred weight. It is about the size of a common walnut-tree, bearing bark which is thick and gummy, and easily parts from the wood. The leaves are winged, and the lobes placed opposite. The flowers, which consist of five petals, are of a beautiful violet colour. They are succeeded by a fruit like small chestnuts, round, solid, and brown; within which is contained another little fruit or nut, of an orange colour. The wood is hard, firm, weighty, and marbled with brown, red, and black: it is of an acrid taste. Guaiacum is the best sort of wood for turnery-ware, especially for making mortars, pestles, rowling-pins, and bowls for the bowling.

bowling-green. In medicine, the shavings or raspings have been long used in ptisans and sudorific drinks for the venereal disease. The bark and gum of this tree have likewise been used with success in the cure of the same disorder, as well as in catarrhs, gout, rheumatisms, and other diseases proceeding from weakness or obstructions of the viscera.

From the seeds of common flax is expressed an oil, which is used both by physicians and painters; from the bark or peeling of the stalks is made linen; and from the rags of linen is made paper; so that this plant is one of the most valuable in the whole vegetable kingdom.

Caltrops, the tribulus of Virgil*, bears a fruit that is armed with strong prickles. These are apt to run into the feet of the cattle which walk over the ground where they are produced. It has derived both its scientific and English names from the form of the fruit, which resembles those instruments of war that were cast in the enemies way to annoy their horse. A similar instrument, and with three iron spikes, (which exactly corresponds to the Greek Τριβαλος, *tres jactus, aut tria jacula*,) has been used in hunting the wolf. The military caltrop has commonly four spikes, one of which is always erect, the other three adhering to the ground.

GYMNODISPERMÆ, (from γυμνος, naked; *dis*, twice; and σπερμα, a seed;) the name of a division in Hermannus and Boerhaave's Methods, consisting of plants which have two seeds that are naked, that is, want the pericarpium or seed-vessel. Of this kind are all the umbelliferous tribe of plants, such as angelica, parsley, hemlock, &c. *Vide UMBELLATÆ.*

GYMNOMONOSPERMÆ, (from γυμνος, naked; *μονος*, alone, single; and σπερμα, a seed). The name of a division in Hermannus and Boerhaave's Methods, consisting of plants which have flowers with one naked seed. Such are all the compound flowers; each floret, or partial flower,

* ———— *subit aspera sylvæ*
Lappæque TRIBULIQUE. ————

Georg. Lib. I. v. 132.

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having a single seed without a covering or vessel placed under it. *Vide* SYNGENESIA & COMPOSITUS *flos*.

In Ray's *Methodus propria*, is a division or class of the same name.

GYMNOPOLYSPERMÆ, (from *γυμνος*, naked; *πολύς*, many; and *σπέρμα*, a seed). The name of a division or class in Hermannus and Boerhaave's methods, consisting of plants which have many seeds that are naked, that is, without any *pericarpium* or seed-vessel. The term is exemplified in anemone, adonis, meadow-rue, virgin's bower and ranunculus.

GYMNOSPERMÆ, (from *γυμνος*, naked; and *σπέρμα*, a seed). The name of a principal division in Hermannus's Method, consisting of plants whose seeds are naked, that is, want a covering or seed-vessel, opposed to *angiospermæ*, which see.

GYMNOSPERMIA, is the name of an order, or secondary division, in the class *didynamia* of Linnæus, consisting of plants which have four stamina two long and two short, and four naked seeds. This order corresponds to the labiati, or lipped-flowers, of Tournefort, and the verticillatæ, or plants that flower at the joints, of Ray, and of Linnæus in his Fragments of a Natural Method.

GYMNOTETRASPERMÆ, (from *γυμνος*, naked; *τέσσαρες*, four; and *σπέρμα*, a seed). The name of a division in Hermannus and Boerhaave's methods, consisting of plants which have four naked seeds. Of this kind are the rough-leaved plants, as borage, bugloss, comfrey and lungwort; and the plants which flower at the joints, as mint, marjoram, thyme and dead-nettle. *Vide* ASPERIFOLIÆ & VERTICILLATÆ.

GYNANDRIA, (from *γυνή*, a woman; and *άνδρ*, a man or husband). The name of the twentieth class in Linnæus's Sexual System, consisting of plants with hermaphrodite flowers, in which the stamina are placed upon the style, or, to speak more properly, upon a pillar-shaped receptacle resembling a style, which rises in the middle of the flower, and bears

bears both the stamina and pointal; that is, both the supposed organs of generation.

The orders in this class are seven, founded each upon the number of the stamina in the plants which compose it. The first order consists of plants which have two stamina, situated as expressed in the classic character. Such are orchis, bastard hellebore, bee-flower, satyrium, limodorum, arethusa, lady's slipper and vanelloe. These plants, which have a particular structure, constitute a true natural order in Linnæus's Fragments, under the name of *orchideæ*. The genera, which were formerly distinguished by the root, Linnæus discriminates by the nectarium, which is different in each genus.

The second order consists of plants with three stamina; it contains two genera, *viz.* *silyrinchium*, or *bermudiana*, and *ferraria*. The third order has four stamina, and contains only one genus, *viz.* *ncpenthes*. The fourth order has five stamina, and contains two genera, *ayenia* and *passion-flower*. The fifth order has six stamina, and contains two genera, *birthwort* and *pistia*. The sixth has ten stamina, and contains likewise two genera, *viz.* *kleinhovia* and *screw-tree*. The last order contains plants which have an indefinite number of stamina. The genera in this order are *grevia*, *cuckow-pint*, *dragons*, *African arum*, *pothos*, and *grass-wrack*.

The flowers of this class, says Linnæus, have a monstrous appearance, arising, as he imagines, from the singular and unusual situation of the parts of fructification.

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HABITUALIS character. The character of plants drawn from their port or habit. *Vide* CHARACTERES.

HABITUS plantæ. By the ancient botanists, the habit of a plant was meant to express its port and general appearance: by Linnæus, habit is defined to be the agreement of plants of the same genus or natural order, in the following circumstances: the number of seminal leaves, (*placentatio*); the

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the nature and form of the root, (radicatio); the situation of the leaves and branches, (ramificatio); the twisting of any of the parts towards one side, as of the stem and corolla, (intorsio); the origin or construction of the buds, (gemma); the complication or folded state of the leaves within the buds, (vernatio); the situation and structure of the stipulæ or scales, which are placed at the base of the young foot-stalks of the leaves and flowers, (stipulatio); the nature of their armature or offensive weapons and vessels of secretion, (pubescentia & glandulatio); their juices, (lactescencia); and the manner in which the flowers are borne, or supported on their footstalks, (inflorescentia). *Vide* PLACENTATIO, &c.

HAMUS, a hook; a species of bristly armour, in which each bristle is bowed inwards at the top. Of this kind are the offensive weapons of burdock and Guinea-hen weed. In lappula, the hooks are three-pointed.

hederaceæ, (from hederæ, ivy). The name of the forty-sixth order in Linnæus's Fragments of a Natural Method, consisting of ivy, and a few other genera, which, from their general habit and appearance, seem nearly allied to it.

List of the Genera contained in this Order.

Linnæan Genera.		English Names.
<i>Aralia</i> ,	—	Berry-bearing angelica,
<i>Cissus</i> ,	—	Wild grape.
<i>Hedera</i> ,	—	Ivy.
<i>Panax</i> ,	—	Ginseng.
<i>Vitis</i> ,	—	Vine.
<i>Zanthoxylum</i> ,	—	Tooth-ach tree.

Habit and Structure of the Plants of this Order.

This order furnishes both herbaceous and shrubby plants, most of which, particularly ivy and vine, have creeping branches, that attach themselves by roots or tendrils to the bodies in their neighbourhood.

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The **ROOTS** are long, with few branches.

The **STEMS** and **YOUNG BRANCHES** are cylindric. In some species of vine they are square.

The **LEAVES** are alternate, sometimes simple, as in ivy and vine, sometimes winged, as in tooth-ach tree, in which the surface of the leaves is covered with points.

The foot-stalk of the leaves is cylindrical, and without any furrow.

The **BUDS** are of a conic form, and without scales.

On each side of the foot stalk of the leaves of the vine, are placed two pretty large **STIPULÆ** or scales. Along the branches of tooth-ach tree are protruded from the bark, a number of prickles which fall off very early.

From the side opposite to the leaves in the vine, proceeds a branching tendril, which serves to fasten the plant in question to the bodies in its neighbourhood, for the purpose of support.

The **FLOWERS** are either hermaphrodite, as in ivy, vine, berry-bearing angelica, and cissus; male and female upon different roots, as in ginseng; or hermaphrodite and male upon different roots, as in tooth-ach tree.

They terminate the branches in an umbel or loose spike in ginseng, berry-bearing angelica and ivy; and proceed in clusters from the side opposite to the leaves in the vine and cissus. In tooth-ach tree they are produced along the branches.

The **CALYX**, or proper flower-cup, consists of one leaf divided into five parts, which are small and generally permanent. In cissus, ivy, tooth-ach tree, and berry-bearing angelica, there is an *involucrum* or cover consisting of many leaves which are permanent, placed under each umbel or cluster of flowers. In ginseng and aralia, the calyx is placed above the seed-bud.

The **PETALS**, in this order, are generally five in number; cissus has four petals, tooth-ach tree none.

The **STAMINA** are in number five, awl-shaped, erect, and generally of the length of the petals. Cissus has only four stamina, which are inserted into the nectarium, a sort of border surrounding the seed-bud.

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The ANTHERS, or tops of the stamina, are roundish, and sometimes, as in ivy, attached to the filaments by the sides. In tooth-ach tree, the filaments are crowned with twin anthers; that is, each filament is furnished with two tops.

The SEED-BUD is sometimes round, sometimes shaped like a top or pear, and ends in one, two or five awl-shaped styles, which are crowned with a simple *stigma* or summit. The flowers of the vine have no style.

The SEED-VESSEL is of the berry kind; with one cell, as in cissus, ivy and vine; two, as in ginseng; or five, as in aralia. In tooth-ach tree, the seed-vessel is a capsule with one cell, and two external openings or valves. Aralia has its berry crowned with the remains of the calyx, which was placed above the seed-bud.

The SEEDS are from one to five in number, placed either in distinct cells, as in aralia; or dispersed through the pulp without any partition, as in ivy berries and the grapes of the vine.

The roots of ginseng, the *panax quinquefolium* of Linnæus, although very hot, are esculent. The Chinese hold the whole plant in great estimation, and affirm it to be a sovereign remedy for all weaknesses occasioned by excessive fatigue, whether of body or of mind. The root, which in shape greatly resembles that of the mandrake, becomes yellowish in drying; and, when chewed, diffuses an agreeable warmth over the whole body. In short, it is a kind of panacea or universal medicine in China, where it is said to be valued at three times its weight in silver.

If the account given by Kolben, in his State of the Cape of Good Hope, be accurate, ginseng, which is known to be a production of China, Japan, Canada, Pennsylvania, Virginia, and Carolina, all situated to the north of the equator, grows likewise naturally and in the same latitude with some of the countries just mentioned, in the southern hemisphere. "There is a root," writes this amusing Traveller, "gathered in the Hottentot countries called *Kanna*, in such esteem among these people for its virtues, that they almost adore it. What much enhances the value of this root is its scarcity, being

being very rarely to be found. They regard it as the noblest restorative in the world, will give almost any thing for it in exchange ; and in short, for the smallest piece of *Kanna*, will perform a hard day's work, run twenty miles upon an errand, nor think any labour a sufficient compensation for so gratifying a present. I have often," he proceeds, " observed the effects of *Kanna* upon Hottentots. They chew and retain it a considerable time in their mouths ; but taking generally too much at a time, it drowns them in intoxications. They chew it not long before their spirits visibly rise, their eyes brighten, their faces assume a jovial air, and they sport and wanton under a thousand gaieties of imagination ; but in the end, it divests them entirely of their senses, and they are thrown into the wildest delirium, and most fantastical extravagancies."

The reader, who would acquire farther notices of this curious plant, is referred to Kalm's Travels into North America, Vol. III. Osbeck's Voyage to China and the East Indies, Vol. I. p. 223, of Forster's Translation. Catelby's Natural History of Carolina, Vol. III. Gronovius's *Flora Virginica* ; and Father Charlevoix's History of Canada or New France.

Wild grapes grow naturally in the West Indies, where they are frequently eaten by the Negroes, but are chiefly food for birds and wild fowl.

Ivy is highly astringent ; the leaves are frequently applied with success to issues and inflammations of the skin. A dose of the full ripe berries has been recommended as a remedy against the plague. The gum of ivy is a powerful resolvent and discutient, and an excellent ingredient in plaisters and ointments for such purposes.

Caspar Bauhin and Tournefort mention a sort of ivy that grows in many of the islands of the Archipelago, to which they have given the name of poet's ivy, because the ancients are said to have made crowns of this plant for adorning the brows of their poets. By others it is called *hedera dionysias*, because they made use of the same sort of ivy in their public rejoicings and feasts in honour of Bacchus. The berries

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are of a fine gold colour; whence the species in question has been termed by others, *chrysocarpus*.

Tooth-ach tree, sometimes called pellitory-tree, is sudorific and diuretic, and is frequently employed in Canada, to promote these secretions.—The bark is prescribed for the tooth-ach, from whence it derives its name.

HEPTANDRIA, (from *ἑπτα*, seven; and *ἀνής*, a man, or husband). The seventh class in Linnæus's Sexual Method, consisting of plants with hermaphrodite flowers which have seven stamina or male organs. The orders are four, derived from the number of styles or female organs. Horse-chestnut and trientalis have one style; limeum has two; lizard's tail three; and septas seven.

HERBA, the herb. By this name Linnæus, in his distribution of the parts of a plant, denominates that portion of every vegetable which arises from the root, and is terminated by the fructification. It comprehends—I. The trunk, stalk, or stem.—II. The leaves.—III. Those minute external parts called by Linnæus the *fulcra* or supports of plants.—IV. The buds; or, as they are termed by the same author, the winter-quarters of the future vegetable.

HERBACEA planta, an herbaceous vegetable; a plant with a succulent stem or stalk, which dies down to the root every year. Of herbaceous plants, those are annual, which perish, stem, root, and all, at the end of one year; biennial, which subsist two years by their roots; perennial, which are perpetuated by their roots for a series of years, a new stem being produced every spring.

HERMAPHRODITA planta. An hermaphrodite plant; that is, a plant producing hermaphrodite flowers only. *Vide infra*.

HERMAPHRODITUS flos; (from *Ἑρμης*, Mercurius, and *Ἀφροδίτη*, Venus,) a flower so termed by the Sexualists, which contains both the *anthers* and *stigma* the supposed organs of generation, within the same calyx and petals. Of this kind are the flowers of all the classes in Linnæus's Sexual Method, except the classes *monœcia* and *diœcia*: in the former of which, male and female flowers are produced

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on the same root; in the latter, on distinct plants from the same seed. In the class *polygamia*, there are always hermaphrodite flowers mixed with male or female, or both, either on the same or distinct roots.

In the plantain-tree, the flowers are all hermaphrodite; in some, however, the *anthers*, or male organ, in others, the *stigma*, or female organ, proves abortive. The flowers, in the former case, are stiled female hermaphrodites; in the latter, male hermaphrodites.

Hermaphrodites are as frequent in the vegetable, as they are rare and unusual in the animal, kingdom.

HESPERIDEÆ (from the Hesperides, whose orchards, according to the Poets, produced golden apples). Golden or precious fruit. The name of the nineteenth order in Linnæus's Fragments of a Natural Method, consisting of the five following genera.

Linnæan Genera.	English Names.
<i>Caryophyllus</i> , —	— Clove-tree.
<i>Eugenia</i> .	
<i>Myrtus</i> , —	— Myrtle, all-spice or pimento.
<i>Philadelphus</i> , —	— Mock orange or fyringa.
<i>Psidium</i> , —	— Guayava or bay-plumb.

Habit and Structure of the Plants of this Order.

The plants of this order are of the shrub and tree kind, and mostly ever-green.

The bark of the stalks is slender, and comes off in thin plates.

The **LEAVES** are generally opposite, and covered with small transparent points. In some genera, particularly the myrtle and guayava, the leaves are placed opposite at the bottom of the stalks, and alternate above.

The **BUDS** are of a conic form. In the mock orange, they are almost spherical, and covered with scales, or rather with leaves, which by their minuteness resembles scales. They are concealed in the cavity which is formed by the
foot-stalk

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foot-stalk of each leaf at its origin.—In the myrtle and guayava are observed two small points in the form of *stipulæ* or scales.

The FLOWERS are generally hermaphrodite. In a species of myrtle, they are male and female upon different roots.

They proceed from the wings of the leaves, either singly, or in clusters like ivy-berries.

The CALYX is placed above the seed-bud, and accompanies it to its maturity.

The PETALS are three, four, or five in number, and stand upon the brims of the tube of the calyx.

The STAMINA are upwards of twenty, nearly equal, and attached in several rows to the middle of the tube of the calyx.

The SEED-BUD is large, oblong, and placed below the receptacle of the flower. The *style* is single, awl-shaped, of the length of the stamina, and terminated with a single *stigma* or summit.

The SEED-VESSEL in guayava and myrtle, is a berry, furnished with one cell in the former, with three in the latter. In mock orange, the seed-vessel is a capsule with four cells; in *eugenia*, it is of the nature of a cherry, and contains a stone.

The SEEDS are numerous, small and oblong, in mock orange and guayava. Myrtle-berries have three single kidney-shaped seeds, one in each cell.

The leaves and fruits of these plants are astringent. The berries are esculent. A decoction of the roots of guayava is employed with success in dysenteries: a bath of a decoction of the leaves is said to cure the itch and other cutaneous eruptions.

Guayava or guava is distinguished from the colour of the pulp into two species, the white and the red; and from the figure of the fruit, into the round, and the pear-fashioned or perfumed guava. The latter has a thicker rind, and a more delicate taste than the other. Either species, if carefully cultivated, and in a good soil, will grow to about eighteen feet in height. The bark is very smooth, and of a reddish grey.

grey. The leaves are about three inches long, sharp-pointed, and have a prominent rib in the middle. The flowers consist of five petals, which are white, and surround a great many short stamina tipped with pale-yellow tops. The fruit is about the bigness of a large tennis-ball; the rind or skin generally of a russet stained with red; the top is adorned, like the apple and pear, with a crown consisting of the remains of the calyx. The pulp within the thick rind is of an agreeable flavour, and interspersed with a number of small white seeds. The rind of the guava, when stewed, is eaten with milk, and preferred to any other stewed fruit. From the same part is made marmaladè; and from the whole fruit is prepared the finest jelly in the world. The fruit is very astringent, and nearly of the same quality with the pomegranate; so should be avoided by all who are subject to be costive. The seeds are so hard as not to be affected by the fermentation in the stomachs of animals; so that when voided with the fœces, they take root, germinate and produce thriving trees. Whole meadows in the West Indies are covered with guavas; which have been propagated in this manner.—The buds of guava, boiled with barley and liquorice, produce an excellent ptisan for diarrhœas, and even the bloody-flux, when not too inveterate. The wood of the tree, employed as fuel, makes a lively, ardent, lasting fire.

The leaves and flowers of common upright myrtle have an astringent quality, and are used for cleansing the skin, contracting the flesh; and strengthening the fibres. From the flowers and young tops is drawn a distilled water that is deterfive, astringent, cosmetic, and used in gargles. A decoction of the flowers and leaves is applied in fomentations. The berries have a binding deterfive quality, and the chemical oil obtained from them is excellent for the hair, and used in pomatums, and most other external beautifiers of the face and skin. As an internal medicine, these berries have little merit: they enter, however, into the composition of several of the strengthening plaisters.

The common clove, a native of the Molucca islands, is

the unripe fruit of the *caryophyllus aromaticus* of Tournefort and Linnæus. The ripe fruit, the mother cloves, or antophilli of the shops, is seldom seen. It is a secret among some who deal largely in cloves, to keep them in a cellar or other damp place, where they will swell and encrease considerably in weight, and look much better, though they are, in effect, much worse, than before such management. The fable of the other trees bending to the royal clove, mentioned by Pomet and Lemery, is too absurd to bear any animadversions. The inhabitants of the island of Massia in the East Indies, where the royal clove grows, string the fruit and make beads of it, which they wear about their necks, on account of the fragrancy of the smell.

Cloves, before they have attained maturity, are of a delightful colour. Some authors relate, that they are originally possessed of such an attractive spongy quality, as frequently to drain, with facility, any liquids that stand near them; so that, unless the master of the ship, which conveys them from the islands, is very careful to keep them at a convenient distance from his liquors, a quantity of them will, in two days time, exhaust and dry up a hoghead of wine or water.

Pimento, all-spice, or Jamaica pepper, is the dried unripe fruit of the *piper odoratum Jamaicense* of Ray, the *myrtus pimento* of Linnæus; the bay-berry tree of some authors. It is a round fruit, with a duskyish, hard, rough, umbilicated rind, containing within it two black kernels, of an aromatic smell and taste approaching to that of cloves, yet partaking, in some degree, of the odour and taste of all the other spices, whence it has obtained the name of *all-spice*. The tree which produces it, rises to the height of thirty or forty feet; and in a rich soil, will grow even to the height of an hundred feet. The leaves are like those of the bay, but of a much stronger aromatic smell; the flowers stand in bunches, and are of a greenish colour; these are succeeded by the fruit, which the Negroes gather before it is ripe, and dry in the sun; in drying, it becomes wrinkled and brown, though formerly smooth and green. The tree grows naturally

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turally in hilly places, in the north part of Jamaica. At Christmas, they usually adorn their churches in the West Indies with small boughs of pimento; as the churches in England are decked with holly and ivy at that sacred season.

All-spice is an excellent aromatic; it fortifies the heart and stomach, dissipates wind, promotes urine and the catamenia, animates the blood and spirits, and removes all manner of obstructions. Thus it is cordial, cephalic, aperient, stomachic and carminative. The oil of pimento, which is procured by distillation, sinks in water like the oil of cloves.

HEXAGYNIA (from ἕξ, six; and γυνή, a woman, or wife). The name of an order or secondary division in the Linnæan System, consisting of plants which, besides their classic character, have their flowers furnished with six styles or female organs. It is only to be found in the ninth and thirteenth classes of the Sexual Method.

HEXANDRIA (from ἕξ, six; and ἀνής, a man, or husband). The name of the sixth class in Linnæus's Sexual Method, consisting of plants with hermaphrodite flowers which are furnished with six stamina or male organs that are of an equal length.

This numerous class of plants is divided into five orders or sections, from the number of the styles or female organs. Narcissus, snow-drop, aloe, yucca, lily, crown imperial, asphodel, spider-wort, flower-of-a-day, tulip, lion's leaf, dog's tooth violet, superb lily, hyacinth, and several others, have one style or female organ: rice, velezia and atraphaxis, have two; dock, star-flower, and medcola, three; guinea-hen weed, four; and water-plantain, five.

The class *hexandria* is distinguished from the class *tetradynamia* of the same author by the proportion of the stamina, which, in the former, are of an equal length, in the latter, unequal; four stamina being long, and two short.

HEXAPETALI, (from ἕξ, six, and πετάλον, a leaf). The name of two classes, or primary divisions, in Rivinus's Method, consisting of plants with six petals, which are either of a regular, or irregular form.

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HILUM, the external mark or scar of a seed in the place where it was fastened within the *pericarpium*. It is conspicuous in the bean, bladder-nut, and heart-feed.

HIRSUTIES. *Vide* PUBESCENTIA.

HOLERACEÆ (from *holus*, pot-herbs). The name of the twelfth order in Linnæus's Fragments of a Natural Method, consisting of plants which are used for the table, and enter into the œconomy of domestic affairs.

List of the Genera contained in this Order.

S E C T I O N I.

Hermaphrodite Plants.

Linnæan Genera.			English Names.
<i>Anabasis,</i>	—	—	Berry-bearing glass-wort.
<i>Anacardium,</i>	—	—	Acajou, or cashew-nut.
<i>Atraphaxis.</i>			
<i>Bafella,</i>	—	—	Malabar night-shade.
<i>Beta,</i>	—	—	Beet.
<i>Blitum,</i>	—	—	Blite, or strawberry spinach.
<i>Bucida.</i>			
<i>Calligonum.</i>			
<i>Callitriche,</i>	—	—	Star-headed Water-Chickweed.
<i>Camphorosma.</i>	—		
<i>Chenopodium,</i>	—	—	Goose-foot, or wild orach.
<i>Coccoloba.</i>			
<i>Corispermum,</i>	—	—	Tickseed.
<i>Heisteria.</i>			
<i>Herniaria,</i>	—	—	Rupture-wort.
<i>Illecebrum,</i>	—	—	Mountain knot-grass, whitlow-grass.
<i>Laurus,</i>	—	—	Bay, cinnamon, camphire, saffrafas, Avocado pear-tree, and benjamin-tree.

Mimusops.

Petiveria,

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Linnæan Genera.		<i>English Names.</i>	
<i>Petiveria</i> ,	—	—	Guinea-hen weed.
<i>Polynemum</i> .			
<i>Polygonum</i> ,	—	—	Knot-grafs, bistort.
<i>Rheum</i> ,	—	—	Rhubarb.
<i>Rhizophora</i> ,	—	—	Mangrove, kandel of the Indians.
<i>Rivina</i> .			
<i>Rumex</i> ,	—	—	Dock.
<i>Salicornia</i> ,	—	—	Jointed glafs-wort, or salt- wort.
<i>Salsola</i> ,	—	—	Glafs-wort.
<i>Tinus</i> .			
<i>Winterania</i> .			

S E C T I O N II.

Male, Female, Androgynous and Polygamous Plants.

<i>Atriplex</i> ,	—	—	Orach.
<i>Axyris</i> .			
<i>Begonia</i> .			
<i>Ceratocarpus</i> .			
<i>Nyssa</i> ,	—	—	The tupelo-tree.
<i>Spinacia</i> ,	—	—	Spinach.

Habit and Structure of the Plants of this Order.

This very numerous order of plants contains trees, shrubs, and perennial and annual herbs; some of the woody vegetables, as the bay, cashew-tree, and *atraxis*, retain their green leaves during the winter.

The ROOTS are very long, and frequently spindle-shaped; from the knots of the stems and branches of such plants as creep on the ground, or float in the water, proceed fibrous and branched roots.

The STEMS and young branches are cylindric. In Malabar night-shade, they climb and are twisted from left to right,

in the direction of the apparent diurnal motion of the sun. In the greatest part of the aquatic plants of this order, the stalks are hollow within. In some species of *polygonum*, the branches being stript of their leaves, appear to be terminated in a thorn.

The BUDS are of a conic form, and naked; that is, not accompanied with scales.

The LEAVES are generally simple, alternate, entire, and attached to the branches by a cylindric foot-stalk, which is sometimes very long, as in the tupelo-tree, but generally very short.—The leaves of glasswort are short, awl-shaped, fleshy, and terminated with spines. In jointed glass-wort, the leaves appear to be nothing else than small appendages of the articulations or joints of the branches.—In mountain knot-grass the leaves are placed opposite; and in *polycnemum*, they are opposite at the bottom, and alternate at top.—Some plants of this order have two STIPULÆ or scales attached to the branches, near the origin of the foot-stalk of each leaf. Those of mangrove are very large, surround the extremity of the branches, and envelop the young leaves, which in unfolding, push off the *stipulæ* that are placed above them.

In many plants, as the bistorts, rhubarb, dock, and atraphaxis, instead of *stipulæ*, each leaf bears on its foot-stalk a membranaceous sheath, which is cylindric, frequently fringed on the margin, and penetrated by the stem. In some species of *polygonum*, the vagina or sheath in question continues a long time after the fall of the leaves.

The FLOWERS in plants of the first section are hermaphrodite: in those of the second, male and female upon the same root, as in axyris; male and female upon different roots, as in spinach; hermaphrodite and male on the same root, as in begonia; hermaphrodite and female on the same root, as in orach; hermaphrodite and male on different roots, as in the tupelo-tree.

In tick-seed, and some species of wild orach, which belong to the first section, there are female flowers mixed with the hermaphrodite upon the same plant.

Many of the hermaphrodite flowers of the cashew-nut prove barren.

The flowers proceed either singly, or in greater numbers, from the angles of the leaves; or terminate the branches in spikes, umbels, or panicles.

These are the only striking and essential characters of this numerous collection of plants: for, as they do not so properly constitute one natural order, as an assemblage of many, a description of the parts of fructification would lead us to a separate discussion of each genus, which is foreign to the design of the present work.

The cashew-nut, or acajou, is a native of both Indies. It is a low, wide-spreading tree, and seldom exceeds twenty feet in height; the branches are crooked, straggling, and covered with oval leaves resembling those of the ivy, or English dwarf-apple. The flowers are small, white, and cut into five segments. These are succeeded by the fruit, which is generally of a yellow colour, as large as an orange, of a conical form, with the lesser end towards the stalk on which it grows. At the greatest end, or outside top of this fruit, sometimes called the cherry, grows the stone commonly styled the nut, quite bare, in the exact shape of a sheep or hare's kidney, about an inch long, containing within it a large white kernel, of a fine taste, which is roasted and eaten. The inside of the fruit or cherry is very stringy, and full of rough, astringent, but pleasant juice, which in America is frequently used, like that of lemons with us, in making punch. The outer shell of the nut is of an ash-colour, and very smooth. Under this outer rind is another which covers the kernel; between them is a thick black inflammable oil, which is very caustic.

When the West-India young ladies fancy themselves too much tanned by the scorching rays of the sun, they gently scrape off the thin outside skin of the stone, and then rub their face all over with the stone. This immediately swells and grows black; and the skin being thus poisoned, will, in the space of five or six days, come entirely off the face in large flakes, so that they cannot appear in public under a full fortnight; by which time the new skin looks as fair as that of a young child.

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The negroes in Brasil cure themselves effectually of disorders in the stomach, by eating of the yellow fruit of the acajou, the juice of which being acid, cuts the thick tough humour which obstructed the free circulation of the blood, and thus removes the complaint. This cure, however, is not voluntary; for their masters, the Portuguese, deny them any other sustenance, and letting them loose to the woods, where the cashew-nuts grow in great abundance, leave it in their option to perish by famine, or sustain themselves with what Nature had provided them.—It is this necessity which leads them to the fruit of the acajou, of which they are not fond; and after continuing the use of it for some days, they return to their masters perfectly recovered from their indisposition, and endued with strength to perform their customary labour.

The milky juice of the cashew-tree will stain linen of a deep black, which cannot be washed out again.

From the berries of climbing malabar night-shade, is drawn a beautiful red colour. The juice of these berries is said to be used for staining calicoes in India. The stalks and leaves of the plant are thick, strong, and succulent.

Most of the species of wild orach have an aromatic foetid smell. A species which grows near the coasts of the Mediterranean is used by the Egyptians in sallads, on account of its saltish aromatic taste, which is agreeable.—From the same plant kelp is made in other countries.

Mangroves, the mangles of Plumier, are often forty or fifty feet high; they grow only in water, and on the banks of rivers where the tide flows up twice a day. They preserve the verdure of their leaves throughout the year. From the lowest branches issue long roots, which hang down to the water, and penetrate into the earth. In this position they resemble so many arcades from five to ten feet high, which serve to support the body of the tree, and even to advance it daily into the bed of the water. These arcades are so closely intertwined one with another, that they form a kind of natural and transparent terrace, raised with such solidity over the water, that one might

might walk upon them, were it not that the branches are too much encumbered with leaves. The most natural way of propagating these trees, is to suffer the several slender small filaments which issue from the main branches, to take root in the earth. The most common method, however, is that of laying the small lower branches in baskets of mould or earth till they have taken root.

The description just given pertains chiefly to a particular species of mangrove, termed by the West-Indians, black mangles, on account of the brown dusky colour of the wood. The bark is very brown, smooth, pliant when green, and generally used in the West-India islands for tanning leather. Below this bark lies a cuticle, which is lighter, thinner, and more tender. The wood is nearly of the same colour as the bark, hard, pliant, and very heavy. It is frequently used for fuel, for which purpose it is said to be remarkably proper: the fires which are made of this wood being both clearer, more ardent and durable than those made of any other materials whatever.—The wood is compact, almost incorruptible, never splinters, is easily worked, and, were it not for its enormous weight, would be commodiously employed in almost all kinds of work, as it possesses every property of good timber.—To the roots and branches of mangroves that are immersed in the water, oysters frequently attach themselves; so that wherever this curious plant is found growing on the sea-shore, oyster-fishing is very easy; as in such cases, these shell-fish may be literally said to be gathered upon trees.

The red mangles or mangrove, grows on the sea-shore, and at the mouth of large rivers, but does not advance, like the former, into the water. It generally rises to the height of twenty or thirty feet, with crooked, knotty branches, which proceed from all parts of the trunk. The bark is slender, of a brown colour, and, when young, is smooth, and adheres very closely to the wood; but when old, appears quite cracked, and is easily detached from it. Under this bark is a skin as thick as parchment, red, and adhering closely to the wood, from which it cannot be detached till the tree

is felled and dry. The wood is hard, compact, heavy, of a deep red, with a very fine grain. The pith or heart of the wood being cut into small pieces, and boiled in water, imparts a very beautiful red to the liquid, which communicates the same colour to wool and linen. The great weight and hardness of the wood prevent it from being generally used. From the fruit of this tree, which, when ripe, is of a violet colour, and resembles some grapes in taste, is prepared an agreeable liquor, much esteemed by the inhabitants of the Caribbee islands.

White mangles, so termed from the colour of its wood, grows like the two former, upon the banks of rivers, but is seldom found near the sea. The bark is grey; the wood, as we have said, white, and, when green, supple; but dries as soon as cut down, and becomes very light and brittle. This species is generally called rope-mangrove, from the use to which the bark is applied by the inhabitants of the West Indies. This bark, which by reason of the great abundance of sap, is easily detached, when green, from the wood, is beaten or bruised betwixt two stones, until the hard and woody part is totally separated from that which is soft and tender. This last, which is the true cortical substance, is twisted into ropes of all sizes, which are exceedingly strong, and not apt to rot in the water.

The ashes of the glassworts and jointed glassworts, are used in making of glass and soap.

True rhubarb is the root of the *rheum palmatum* of Linnaeus. The leaves are hand-shaped and pointed. The purgative quality of the root is too well known to be enlarged on in this place.

A species of rhubarb, called by the Arabians, *ribes*, grows naturally on mount Libanus, and other mountainous parts of Syria. The surface of the leaves is covered with warts or rough protuberances.—The monks in those parts are said to subsist principally upon this plant.

The avocado or avigato pear-tree, a native of the West-India islands, so called from its fruit, which in form and thickness resembles a pear, is the *laurus persea* of Linnaeus.

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The pulpy or fleshy part of the fruit is of a pale green, with little or no consistence when ripe, and melts in the mouth like marrow, which it greatly resembles in taste.—The skin is smooth and thin, but of a strong tough substance, and of a beautiful green colour, which does not become yellow till the fruit is perfectly ripe.—The fruit, by reason of its softness, may be eaten out of the surrounding skin with a tea-spoon, like jelly and marmalade. It is frequently served up, in the West-Indies, on a plate with sugar, rose-water, and orange-flowers; most commonly, however, it is mixed with sugar; and the juice of limes, which render it extremely palatable. The unripe fruit too is frequently plucked, and eaten in thin slices with pepper and salt. In this stage, the taste of the avocado greatly resembles that of artichoke. Every preparation of this fruit is esteemed highly nourishing; as it warms, exhilarates, and fortifies the stomach.—It is particularly recommended in dysenteries. In the middle of the pulpy part of the fruit lies the nut or seed, which is very large, almost round, of a pale russet colour, a little wrinkled, contains no kernel within it, and whose degree of hardness does not exceed that of a chestnut divested of its skin. This nut, about an hour after it is separated from the fruit, splits of itself into two or three pieces. If committed to the ground in this state, no vegetation ensues, because the embryo of the seed is broken; so that such as would propagate these plants from seed must sow the nuts the moment they are taken out of the pulp; in which case they will begin to germinate in eight or ten days after. The bark and wood of this tree, which rises to a considerable height, are of a greyish colour. The leaves are long, pointed, of a substance like leather, and of a beautiful green colour. The flowers are produced in large knots or clusters at the extremities of the branches, and consist each of six petals disposed in the form of a star, and of a dirty-white, or yellow colour, with an agreeable odour, which diffuses itself to a considerable distance. The tree begins to bear fruit two years and a half, or at most three years after being planted; and, like most of the trees in warm climates, bears twice a year.

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The buds of the avigato pear-tree are said to be used with success in ptisans against the venereal disease. An infusion of them in water, drunk in the morning fasting, is strongly recommended for dislodging coagulated blood in the stomach produced by a fall or a severe stroke on that important *viscus*. “The wild boars in the Indies,” says Labat, “eat greedily of the mammees and avigato pears, which give their flesh a luscious and most agreeable flavour.”

The wood of the *laurus borbonia*, or red bay of Carolina, is much esteemed, being of a very fine grain; so is frequently made into cabinets, and other ornamental furniture. It dyes a beautiful-black colour.

Camphire-trec, the *Laurus Camphora* of Linnæus, the *Laurus Camphorifera* of Kæmpfer, grows naturally in the woods of the western parts of Japan, as likewise in Sumatra, Borneo, and other parts of India. The root smells more of camphire than the other parts, and being boiled yields it. The bark of the stalk is, outwardly, somewhat rough; but in the inner surface, smooth and mucous, and therefore easily separated from the wood, which is dry, and of a white colour. The leaves stand upon slender footstalks, have an entire undulated margin, run out into a point, have the upper surface of a lively and shining green, the lower herbaceous and silky, and are furnished with a few lateral nerves, which stretch archwise to the circumference, and frequently terminate in small warts; a circumstance which may be considered as peculiar to this species of laurel. The flowers are produced on the tops of footstalks, which proceed from the arm-pits of the leaves, but not till the tree has attained considerable age and size. The flower-stalks are slender, branched at the top, and divided into very short pedicles, each supporting a single flower. The flowers consist of six white petals, and are succeeded by a purple shining berry, of the size of a pea, and in figure somewhat top shaped. It is composed of a soft pulpy substance, that is purple, and has the taste of cloves and camphire, and of a *nucleus* or kernel, of the size of a pepper, that is covered with a black, shining, oily corticle, of an insipid taste.

Camphire.

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Camphire-tree is known in Japan by the several names of Sſio, Kus-no-ki and Nambok. The substance termed camphire is procured by distilling the roots and branches of the tree in an alembic having a head made of twisted and plaited straw. All the humidity evaporates through the head, and the camphire sticks to it. In this state it is of a greyish colour; but, after being refined by sublimation in a sand-heat, it becomes white and transparent. Taken inwardly, camphire is cordial, sudorific, and anodyne; used externally, it is a powerful discutient. The ancients believed it to be an enemy to generation, which proves to be a mistake.

Substances resembling camphire, and oil of camphire, are likewise obtained from the roots of *Laurus Cassia*, termed by Kæmpfer *Cassia Canellifera*, from the bark of which is also got, by distillation, an oil of cinnamon, and from the leaves, an oil of cloves. The same curious traveller informs us, that a camphire is deposited in great abundance at the bottom of the oil obtained by distillation from the Arabian and Persian *Schœnanthus*: and he doubts not that a similar substance might be extracted from juniper and other plants, which have the camphire-smell, as the Bramins extract a sugar from every sweet, even from milk itself. A tree which grows naturally in Sumatra and Borneo yields a crystalline camphire, that is exceedingly precious and rare.

The tree which produces the gum or substance called benjamin is the *laurus benzoin* of Linnæus. The leaves are like those of the citron and lemon-trees, only smaller, and less lucid.—Benjamin promotes expectoration, and is of great force and prevalence in the asthma, and lingering plithifical coughs. “It is likewise endued,” says Lemery, “with a virtue to provoke urine and perspiration.”

Sassafras-tree, the *laurus sassafras* of Linnæus, grows naturally in many parts of North America, particularly Florida, where there are whole forests of it. It has a very strait trunk, which rises about ten feet high. The branches on its top are covered with green leaves like those of the fig-tree, which the inhabitants esteem an excellent vulnerary, when bruised.

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bruised. The bark is reddish, thick, and rough, and more fragrant than the wood. When the wood is cut or rasped for use, the smell is so strong that it occasions the head-ach in those that work upon it; as it likewise does in those that use it, which has much lessened its credit.—Used in infusion like tea, the wood is a powerful antiscorbutic.—In Carolina, a decoction of the wood and leaves has been administered with success in intermitting fevers. In pains of the feet, an oil obtained from the broiled berries of saffrafras, rubbed into the part affected, though attended with a disagreeable nausea, never fails, says Kalm, to produce a speedy and perfect cure.—The bark dyes an orange colour, that is particularly pleasing to the eye, and does not fade in the sun.—In New Jersey, and other parts of North America, they wash and scour the vessels in which they intend to keep cyder, beer, or brandy, with water in which the saffrafras-root, or its peel, has been previously boiled—a precaution which they think renders all those liquors both more palatable and more wholesome. Some get their bed-posts made of the wood of saffrafras, in order to expel the bugs: and in Pennsylvania, for a similar purpose, they put chips of it into their chests containing cloaths, and other woollen stuffs, to get rid of the larvæ and moths, which commonly settle in them in summer.—Saffrafras-wood, thrown into the fire, crackles like salt. It lasts, we are told, a long time under ground: yet is there hardly any kind of wood which, when exposed to the air without cover, is more generally attacked by vermin, so as in a short time to be quite worm-eaten through and through.

Cinnamon-tree, the *laurus cinnamomum* of Linnæus, is a native of the island of Ceylon in the East Indies. The leaves have three beautiful nerves, which run through the disk or surface, and disappear towards the top. The tree has three barks or rinds. The first and second are only used; the third, and innermost, which incloses the body of the tree, being never touched; not, as some have pretended, because it is of no value; but because an incision in it kills the tree. After three years time, the two extreme barks are

are renewed, and fit to be pulled off. When the Dutch, say some authors, who ingross the whole trade of this and the other spiceries, are apprehensive of abating the value of cinnamon, by sending home too great abundance, and thereby glutting the European markets, they lay it on an heap, and burn as much of it as they imagine useless for their service; which spicy mountain sends out its fragrant exhalations for many leagues into the sea; so that of these coasts it may be truly affirmed, in the beautiful language of Milton, that

“Pleas’d with the grateful smell, old Ocean smiles.”

The Dutch, not remarkable for honesty in any of their dealings, are particularly fraudulent in conducting the spice trade: for they frequently extract a quantity of oil, essence, or spirits, from the cinnamon and cloves; and then confidently expose them for choice untainted commodities. Hence we often meet with several spiceries, cinnamon in particular, that are very dry and insipid, almost devoid of smell and taste, and pillaged of their oil and essential substance.—The fruit of the cinnamon-tree yields, by coction and expression, an oily substance, of which candles are made for people of the first rank: and from the neck of the root is drawn a fine kind of camphire, of a spicy, aromatic smell, very rarely to be met with in Europe.

“In Siberia,” says Gmelin, “they eat for ordinary food, the root of a species of *polygonum*, termed by some botanists, *bistorta montana minor*; and by Haller, *bistorta foliis ad oram nervosis*. The natives call it *mouka*; and so indolent are they, that, to save themselves the trouble of digging it out of the earth, they go in spring and pillage the holes of the mountain-rats, which they find filled with these roots.”

White Beet, the *Beta Cicla* of Linnæus, is a variety of the common Beet well known to be cultivated in gardens, as are all its varieties, for the sake of the leaves. I mention it in this place with a view of introducing a series of experiments made by M. Margraaf, with a
view

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view of extracting sugar from the roots of this and some other vegetables. The plants which that ingenious philosopher has examined chymically for the purpose just mentioned, are common in most countries, and demand neither a favourable soil, nor an assiduous culture.—Such are,

1° White Beet, *cicla officinarum*.

2° Skirret, *Sium Sifarum*.

3° Red Beet.

The roots of plants containing sugar may be sufficiently known by these characteristics. When cut into small pieces, and carefully cleaned, they impress upon the palate a very agreeable sensation: and, if examined by the microscope, exhibit a number of white crystalline particles, which are the sugar of the plant. Sugar being a salt which is dissolved in brandy, M. Margraaf imagined that it might likewise be extracted from vegetables with the assistance of that liquor. To determine the quantity of sugar which might be dissolved by this method, he put into a glass one ounce of the best and finest sugar, well pulverised, with four ounces of the strongest brandy. The whole being well digested, he made the mixture boil, and the sugar was soon perfectly dissolved. The solution being still warm, he passed it through a very fine scarce or sieve into another vessel. This he carefully stopped, and had the pleasure at the end of eight days to find the sugar restored, and formed anew into regular and beautiful crystals. To succeed in this experiment, it is necessary that the vessel and the sugar be well dried, and the spirit highly rectified.

Prepared by the experiment just related, the ingenious chymist cut into very thin slices some roots of White Beet, which he had selected for the purpose, and dried them before the fire, taking care, however, that they might not be burnt. He next reduced them to a gross powder, which he a second time dried, as it easily contracts humidity. Of this powder, whilst still hot, he put eight ounces into a glass vessel, and poured over it sixteen ounces of spirit so strong that it kindled gun-powder. The vessel being half full, he placed it, well stopped, into a sand-heat, till the spirit began to boil:

striking the powder at proper intervals, that it might not fall to the bottom.—As soon as the spirit had begun to boil, he removed the vessel from the fire, and poured the mixture it contained as quickly as possible into a coarse linen bag, squeezing it hard, in order to express all the liquor. This he immediately passed, whilst hot, through a finer cloth, into a glass vessel, which he carefully stopped, and kept in a warm place. At first the liquor was disturbed; but at the end of some weeks it had precipitated a crystalline sediment, which had all the appearance and properties of sugar in its less refined state. By this first experiment, M. Margraaf extracted from the three roots formerly mentioned the following quantities of sugar:

1. From half a pound of the root of White Beet, half an ounce of pure sugar.

2. From half a pound of Skirret, an ounce and half of pure sugar.

3. From the same quantity of Red Beet, an ounce and a quarter of sugar equally pure.

These experiments prove, that lime-water is not so necessary for drying and thickening the sugar as certain chymists have pretended, since it certainly crystallises without it.

Being thus well assured from actual observation, that the plants in question were possessed of a real sugar, he next employed himself in discovering a less expensive method of extracting it. Such an end, he thought, would most effectually be attained, 1^o, by expressing the sweet sugar juice, purifying it, and disposing it to crystallize by evaporation;—2^o, by purifying the crystals which might result from the preceding operations.

Having taken with this view, a certain quantity of Skirret, he cut the fresh roots into very small pieces, and having bruised them with all his strength in an iron mortar, removed them into a linen bag, and expressed the juice by means of a press prepared for that purpose.—He then poured water upon the roots in the bag, and pressed them a second time. The liquor thus obtained he put into proper vessels, and kept in a cool place for 48 hours, at the end of which time it was

clear, and a meally substance had fallen to the bottom. He now, therefore, very gently passed the liquor through a fine linen cloth into another vessel.

The first clarification thus accomplished, he added to the juice some whites of eggs, and then boiled the whole together in a copper pan, continuing to skim it, till there appeared no more impurities on the surface, and the liquor was as transparent as the brightest and best clarified wine. He boiled it a second time in a lesser pan, till it had lost considerably of its quantity; and thus he continued, using still smaller vessels, till the liquor, originally thin, was reduced to a syrup of a pretty thick consistence. This he kept in a warm place for six months, at the end of which time he found the sugar collected upon the sides of the vessel in the form of crystals. To purify these, which was the second and principal operation, he immersed the vessel containing them into warm water, and when the heat had rendered the mixture fluid, he poured over the liquor and the crystals into an earthen vessel having a very large mouth, with a narrow bottom pierced with several holes. This vessel he placed within another, and left them in this situation, in a temperate place. By degrees the syrup fell into the vessel below, whilst the crystals remained in the upper.

To render this raw sugar still purer, he now put it into a sort of blotting paper folded in different forms, which he gently squeezed with his hand. It had the desired effect: the paper imbibing much of the viscous and tenacious syrup which was attached to the sugar.

Thus freed of its impurities, he dissolved it a second time in water, passed it again through the finest linen, and boiled it to the consistence of a thick syrup. He then added some lime-water, and after boiling it a-fresh, till it was ropy, took it off the fire, and kept stirring it till cool; when he once more poured it over into earthen vessels of a conical form, stopped with wood. These he put within other vessels of the same form and substance, but thicker: and the crystals in the course of eight days being completely formed, he, after that period, suffered the syrup to flow into the lower

vessel, and drying the sugar by means of the blotting-paper as before, had the satisfaction to find it as pure and beautiful as the best sugar which is produced from the sugar-cane; and the syrup to serve the same purposes as common treacle.

By the same operation may sugar be extracted from White and Red Beet. That of Skirret is superior to the sugar obtained from Red Beet: but the sugar from the White Beet M. Margraaf affirms to be the best of all.

Continuing his experiments, this ingenious naturalist next essayed to extract sugar from the stems and leaves of these plants; but from those with all his efforts he could only obtain a sort of earth.

Might it not be very advantageous for the poor inhabitants of the country to procure to themselves a sugar from such common plants as have been mentioned, instead of purchasing foreign sugar at so dear a rate? In such a case, it would not be necessary that they should follow all the steps of the process just described;—it would be sufficient to express the juice, to purify it a little, and boil it to the consistence of a syrup.

Encouraged by the success of these experiments—experiments which plainly evince that the countries which produce sugar-canes, produce them not exclusively, since Nature has furnished every country with sugar-plants—Margraaf has since extended his enquiries on the same subject to a great number of vegetables. I shall mention the result of a very few only. Carrot yields a very sweet juice, but resembling honey rather than sugar. The same is affirmed of the Gourd. From Parsnip he procured a small quantity of sugar, as likewise from the American Aloe. The juice which is obtained from the Birch-tree by incision in water, yields a sort of manna. Lastly, grapes moistened, and then pressed, give a syrup which contains a little sugar.

HOROLOGIUM *Floræ. Vide VIGILIÆ.*

HYBERNACULUM, winter-quarters; defined by Linæus to be a part of the plant which defends the embryo-herb from injuries during the severities of winter. *Vide BULBUS & GEMMA.*

I C O

HYBRIDA *Plantæ*, a monstrous production of two different species of plants, analogous to a mule among animals. —The seeds of hybrid plants will not propagate.

I.

ICOSANDRIA, (from *είκοσι*, twenty, and *άνη*, a man or husband); the name of the twelfth class in Linnæus's Sexual Method, consisting of plants with hermaphrodite flowers furnished with twenty or more stamina, that are inserted into the inner side of the calyx, or petals, or both. By this last circumstance, and not by the number of stamina, is the class in question distinguished from that immediately following it, termed *polyandria*, in which the number of stamina is frequently the same with that of the plants of the class *icosandria*, but they are inserted, not into the calyx or petals, but into the receptacle of the flower.

This nice and minute distinction requires the strictest attention, because of the very different nature of the plants of these two classes. *Icosandria* furnishes the pulpy fruits that are most esteemed, such as apples, pears, pomegranates, medlars, gooseberries, raspberries, strawberries, currants, almonds, peaches, plums, apricots, cherries, and guavas. The plants of the class *polyandria* are mostly poisonous: such, for instance, are aconite, columbine, larkspur, hellebore, virgin's bower, pæony, herb-christopher, burning thorny plant, and some others.

Besides the characters just mentioned, the plants of the class *icosandria* have a hollow flower-cup composed of one leaf, to the inner side of which the petals are fastened by their claws.

The orders in this class are five, founded upon the number of the styles or female organs.

Mock-orange, myrtle, almond, and plum trees, have one female organ; wild service has two; service and sesuvium, three; medlar, apple, fig-marigold and spiræa, five; rose, raspberry, strawberry, herb-bennet, and cinquefoil, an indefinite number.

IMPERFECTUS

IMPERFECTUS *Flos.* Vide APETALUS *Flos.*

IMPLETIO. Vide PLENUS *Flos.*

INCOMPLETÆ, the name of the ninth class in Royen's Natural Method, and the sixteenth in Linnæus's *Methodus Calycina*; consisting of plants whose flowers want either the calyx or petals.

INCOMPLETUS *Flos.* Vide APETALUS *Flos.*

INFLORESCENTIA, (from *infloresco*, to flourish,) a mode of flowering; the manner in which flowers are supported on their footstalks.

The various modes in which flowers are joined to the plant by the *pedunculus* or footstalk, are expressed by the following terms:

VERTICILLUS.

SPICA.

CORYMBUS.

CAPITULUM.

FASCICULUS.

THYRSUS.

RACEMUS.

PANICULA.

Each of these terms is explained in its proper place.

We may here observe that the various modes of flowering just mentioned are equally applicable to those flowers which proceed from the angle formed by the leaves and branches, as do most flowers, and to such as terminate the stem and branches. In the former case, flowers are termed *axillares*, that is, proceeding from the arm-pit of the leaf: in the latter, *terminales*, that is, terminating the branch.

Some terms respecting inflorescence will be explained under the article PEDUNCULUS, which see.

Inflorescence affords an excellent characteristic mark in distinguishing the species of plants, but is never, according to Linnæus, to be employed as a generic difference. Many eminent botanists, however, among whom are Ray, Rivinus, Knaut, and Kramer, have employed it in discriminating the genera.

I N T

INTORSIO, a term of habit respecting the flexion or bending of any of the parts of a plant towards one side.

Twining Stems.

In hops, honeysuckle, dioscorea, black bryony, hippocratea, and moon-seed, the stalks twine to the left; in kidney-bean, convolvulus, Virginian-silk, quamoclit, and spurge, they bend towards the right.

Twining Claspers or Tendrils.

These wind to the right, and back again: of this kind are the tendrils of most of the pea-bloom or leguminous tribe of plants.

Twisted Flowers.

In swallow wort, oleander, periwinkle, Virginian-silk, and stapelia, the petals bend to the left; in *pedicularis*, to the right.

The pointal in cucubalus, and viscous campion, is twisted to the left; as is the seed-bud in screw-tree, and *spiræa ulmaria*.

The spikes of flowers in claytonia, and some species of rough-leaved plants, are spirally twisted; in poppy, marta-gon lily, guinea-hen weed, and lizard's tail, they are bowed or crooked.

In oats, the beard which terminates the husk is twisted like a rope. The proper coat of the seeds of some species of geranium has a spiral tail of the same kind. This species of contorsion being affected by the moisture or dryness of the atmosphere is termed by Linnæus, *intorsio hygrometrica*.

To the different species of intorsion may be added the appearance of the petals in the European species of violet, oriental bugle, basil, and a species of satyrium, in which the upper lip of the *corolla* looks towards the ground, and the under lip upwards. This appearance is termed by Linnæus, *resupinatio*.

INUNDATA

INUNDATA *Löca*, (*inundari*, to be over flowed,)—a term of soil—places covered with water.

INUNDATÆ, the name of the fifteenth order in Linnaeus's Fragments of a Natural Method, consisting of plants which grow in the water.

List of Genera contained in this Order.

Linnæan Genera.		English Names.
<i>Ceratophyllum</i> ,	— —	Horned pond-weed.
<i>Elatine</i> ,	— —	Water-wort.
<i>Hippuris</i> ,	— —	Female horse-tail.
<i>Myriophyllum</i> ,	— —	Water-milfoil.
<i>Potamogeton</i> ,	— —	Pondweed.
<i>Proserpinaca</i> .		
<i>Ruppia</i> .		
<i>Zannichellia</i> ,	— —	Triple-headed pondweed.

Habit and Structure of the Plants of this Order.

The plants of this order are aquatic, of low stature, herbaceous, and mostly perennial.

The **ROOTS** are fibrous.

The **STEM** is generally wanting. In its place are an assemblage of leaves, which, wrapping or enfolding one another mutually, form a sheath, from the middle of which is produced the foot-stalk of the flower.

The **LEAVES** are sometimes alternate, sometimes placed in whorls round the stem. In a great many genera, the foot-stalk is extended at its origin into a membranaceous substance forming a sheath, that is cleft through the whole length, on the side opposite to the leaf.

In some species of pondweed the sheath in question is exactly like that of the grasses, being terminated at the top, like the plants of that natural family, with a membranaceous triangular crown. In water-milfoil, ceratophyllum, and proserpinaca, the footstalk of the leaves forms no sheath of this kind. The leaves of an aquatic plant of Madagascar, which

Adanson affirms to be nearly allied to pondweed, are pierced through the sieve in different places round the ribs.

Few, if any, of these plants are covered with down or hair.

The FLOWERS are hermaphrodite in pondweed, *proserpinaca*, *elatine*, *hippuris* and *ruppia*; male and female on the same root in the rest. Adanson pretends, with what foundation I know not, that the flowers in *ruppia* are likewise male and female upon the same spike.

The disposition of the flowers in this order serving frequently of itself to distinguish the genera, deserves particular attention.

I. The flowers in water-milfoil, *ceratophyllum*, *proserpinaca*, *elatine* and *hippuris*, proceed singly from the wings of the leaves. Those of the lower leaves of water-milfoil are female; those of the upper, male.

II. Triple-headed pondweed has two flowers in the same wing; one male and the other female.

III. The flowers in pondweed and *ruppia* are disposed in spikes in the wings of the leaves. In *ruppia*, says Adanson, male flowers are arranged on one side of the spike, and female flowers on the other.

The FLOWER-CUP is either wanting, as in *hippuris* and *zannichellia*; or consists of three, four or five divisions or leaves, which accompany the seed-bud to its maturity.

The PETALS are generally wanting.—*Elatine* has four petals, that are egg-shaped, blunt, and spreading. Pondweed has a like number.

The STAMINA are in number from one to sixteen and upwards. The filaments, in some genera, are so short, that they seem wanting.

The anthers or tops are short, and generally marked with four longitudinal furrows. In *ruppia*, the anthers have one cell, and open at top.

The SEED-BUDS are in number from one to four. The style is frequently wanting.—In *proserpinaca*, the seed-bud is placed below the receptacle of the flower.

The SEED-VESSEL is universally wanting, except in *elatine*,

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elatine, which has a dry capsule with four external openings, and the same number of cells.

The SEEDS are generally four in number.—In *ceratophyllum*, the fruit is a nut or stone, which is egg-shaped, pointed, and contains a single cell.

INVOLUCRUM, (from *involvere*, to roll or wrap up) a species of calyx restricted by Linnæus to umbelliferous flowers.

It is placed below the common receptacle, which in these flowers is a number of foot-stalks, that proceed from the same centre, and rise to the same height. Each foot-stalk is terminated with an umbel similar in its form and structure to the large umbel, and generally furnished like it with an *involucrum* or cover. When a calyx of this kind is placed under the longer or universal umbel, it is styled an universal cover; when under the partial or smaller umbel, a partial cover. *Vide UMBELLA & UMBELLATÆ.*

Umbelliferous flowers, besides the two covers already mentioned, have generally a proper perianthium or flower-cup under each of the florets of which the umbel is composed.

The partial *involucrum* of an umbelliferous flower is sometimes termed *involucellum*, that is, lesser cover.

The universal cover is either of one leaf, as in coriander and caraway; of three, as in angelica; of four, as in bastard stone-parsley; of five, as in Macedonian parsley; of seven, as in lovage; or of many, as in laserwort and water dropwort.

The partial cover consists either of two leaves, as in artedias; of five, as in hare's ear; or of many, as in bishop's weed and fennel giant.

In sanicle, the universal, in coriander, the partial cover, goes but half way round the receptacle formed by the foot-stalks or rays of the umbel.

Thapsia, parsnep, alexanders, dill, burnet-saxifrage, and herb gerard, want both the universal and partial cover; shepherd's needle, chervil, masterwort and fesceli, are furnished with the partial, but want the universal cover.

IRREGULARIS

IRREGULARIS *flos*, an irregular flower; a flower that wants uniformity; the term is generally applied to the petals, and is synonymous to the *anomalus* of Tournefort, and the *difformis* of Jungius and Christian Knaut.

Examples of flowers with irregular petals are exhibited in the pea-bloom or leguminous tribe of plants, the lipped-flowers, violet, aconite, lark-spur, and some others.

IRREGULARES. The name of a division in Rivinus's Method, consisting of plants which have irregular flowers. *Vide supra.*

ISOSTEMONES (from *isos*, equal, and *stamen*). The name of a class in Haller's Natural Method, consisting of plants whose stamina or male organs of generation are equal in number to the petals. Such are pimpernel, campanula, night-shade, bryony, borage, apocynum, and the umbelliferous flowers.

Most of Linnæus's class *pentandria* belong to this division of Haller.

JULIFERÆ, (from *julus*, a catkin, and *fero*, to bear,) trees bearing flowers in catkins. The name of a class in Hermannus's System, corresponding to the *amentaceæ* of Boerhaave and Tournefort. *Vide* **AMENTACEÆ** and **AMENTACEUS** *flos*.

JULUS, (Ἰελος, lanugo, quæ ἵεται ὕλην, exit mollis). Catkin. By this term, as likewise by the names, *nucamentum* and *catulus*, some former botanists distinguished the species of calyx called by Linnæus *Amentum*, which see. The term is manifestly as old as Pliny, who, in the 39th Chapter of the 16th Book of his Natural History, uses it of the hazel-tree, an amentaceous or catkin-bearing plant.—*Ferunt et Avellanæ Julos compactili callo ad nihil utiles.*

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LABIATUS *flos*, a lipped-flower; a flower consisting of one irregular petal whose divisions resemble two lips. The lipped-flowers constitute a class in Tournefort's Method, by

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by the name of *labiati*, and are the *didynamia gymnospermia* of Linnæus, and the *verticillatæ* of Ray ; by which name, likewise, they are distinguished in Linnæus's Fragments of a Natural Method. *Vide VERTICILLATÆ.*

Mint, thyme, marjoram, balm, dead nettle, and hyssop, furnish examples of the term in question. Lipped-flowers make part of the grinning or gaping flowers of Linnæus. *Vide COROLLA ringens.*

LACINIÆ, (properly fringes, lappets, pieces, or jags.) In botanical language the several sections of the calyx, petals, and pistillum. The term is likewise applied to leaves.

LACTESCENTIA, (from *lac*, milk). A term of habit respecting the juices or liquors, of whatever colour, which flow out of plants when any injury is done them.

The colour of the juices in question is either

White, as in burning thorny plant, poppy, swallow-wort, apocynum, cynanchum, campanula, cardinal flower, sheep-scabious, maple, sumach, milk-parsley, a species of melon-thistle, fow-thistle, dandelion, hawk-weed, nipple-wort, and the other compound flowers with flat or tongue-shaped florets, the *semiflosculosi* of Tournefort, the *flores ligulati* of Linnæus.

Yellow, as in celandine, *bocconia*, and puccoon.

Red, as in bloody dock.

Most lactescent plants are poisonous, except those with compound flowers, which are generally of an innocent quality.

Of the poisonous lactescent plants the most remarkable are sumach, agaric, maple, burning thorny plant, cassida, celandine, puccoon, prickly poppy, and the plants of the natural order *contortæ*, as swallow-wort, apocynum, cynanchum, and cerbera.

The bell-shaped flowers are partly noxious, as cardinal flower ; partly innocent, as campanula.

Among the lactescent plants with compound flowers that are innocent in their quality, may be mentioned dandelion, picris, hyoseris, wild lettuce, gum-succory, hawkweed,
bastard

bastard hawkweed, hypochæris, goat's beard, and most species of lettuce: I say most species, because the prickly species of that genus are of a very virulent and poisonous nature.

LACTESCENTES. The name of a class in Morison's Method, consisting of plants with compound flowers which abound with a white milky liquor. Such are the semi-flocculosi of Tournefort, just mentioned. *Vide supra.*

LAMINA, a plate; the upper spreading part of a flower consisting of more than one petal. *Vide COROLLA.*

LANA, wool; a species of pubescence, down or velvet, which serves, according to Linnæus, as a veil to screen the leaves and branches which are covered with it from the extremities of heat.

The appearance in question is very conspicuous in horehound, mullein, stachys, sage and iron-wort of canary, woolly thistle, and some others.

LEGUMEN, (properly all manner of pulse, as pease, beans, &c.)—that species of the seed-vessel termed a pod, in which the seeds are fastened along one suture only. In this last circumstance, the seed-vessel in question differs from the other kind of pod, termed by botanists *siliqua*, in which the inclosed seeds are fastened alternately to both the sutures or joinings of the valves. *Vide SILIQUA.*

The seed-vessel of all the pea-bloom or butterfly-shaped flowers, the *diadelphia* of Linnæus, is of the leguminous kind. Such, for instance, is the seed vessel of the pea, vetch, lupine and broom. *Vide PAPILIONACEÆ.*

The valves or external openings for the purpose of dispersing the seeds are, in both kinds of pod, two in number.

LEGUMINOSÆ (from *legumen*). The name of a class in Morison, Hermannus, Boerhaave, Ray, and Royen, consisting of plants whose seeds are inclosed in a leguminous pod. The term corresponds to the *papilionacci* of Tournefort and Pontedera, and the *diadelphia* of Linnæus in his Sexual System. *Vide LEGUMEN.*

LIBER, the inner bark or rind of plants. For a particular description of the bark, and the other internal organized

nized parts of vegetables, the reader is referred to the article STRUCTURA VEGETABILIS.

LIGNUM, the wood. *Vide* STRUCTURA VEGETABILIS.

LIGULATUS *flos*, (from *ligula*, a strap or fillet) a species of compound flower so termed by Linnæus, all the florets or partial flowers of which are flat or tongue-shaped, and expanded towards the outer side.

Of this kind are dandelion, sow-thistle, lettuce, succory, nipple-wort, hawkweed, goat's beard, scorzonera, picris, and some others. The flowers in question correspond to the *semiflosculosi* of Tournefort, the *lingulati* of Pontedera, the *planipetali* of Boerhaave and Ray, the *cichoracei* and *acănaceæ* of Cæsalpinus, and the *lactescētes* of Morison.

These plants generally abound with a milky juice, which is of an innocent quality.

LILIACEI, (from *lilium*, a lily). The name of the ninth class in Tournefort's Method, consisting of plants, whose flowers resemble those of the lily, being generally composed of six regular petals; sometimes, however, of three, or even of one that is deeply divided into six parts. The seeds of the liliaceous flowers are generally contained within a capsule having three cells.—Asphodel, lily-asphodel, hyacinth, grape-hyacinth, meadow saffron, bulbocodium, crocus, narcissus, iris, corn-flag, aloe, Adam's needle, Indian flowering reed, ginger, blood-flower, flower-of-a-day, spiderwort, lily, squill, crown imperial, tulip, dog's tooth violet, superb lily, star of Bethlehem, *aphyllanthes*, leek, onion, garlick, amaryllis, snow-drop, and bermudiana, are the liliaceous flowers of Tournefort.

LILIACEÆ is likewise the name of an order in the former editions of Linnæus's Fragments of a Natural Method, consisting of only four genera: viz, the lily, tulip, dog's-tooth violet, and crown imperial; which, in the later editions, are arranged with several other genera, under an order distinguished, somewhat improperly, by the name of *coronariæ*. *Vide* CORONARIÆ.

LILIA. The name of the second class in Royen's Natural

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Natural Method, corresponding to the liliaceous flowers of Tournefort, and the *coronariæ* of Linnæus.

LIMBUS, (properly a lace, border, or fringe,)—the *limb*, or upper expanded part of a flower consisting of only one petal: opposed to the tube, which is the lowest part.

The limb is either bell-shaped, funnel-shaped, salver-shaped, wheel-shaped, or gaping. *Vide* COROLLA.

LINGULATUS *flos*. *Vide* LIGULATUS *flos*.

LINGULATI, the name of a class in Pontedera's System, consisting of compound flowers with flat tongue-shaped petals. It corresponds to the *semiflosculosi* of Tournefort, the *planipetalæ* of Ray, and the *compositi ligulati* of Linnæus, and is exemplified in dandelion and endive. *Vide* SEMIFLOSCULOSI, &c.

LOCULAMENTA and **LOCULI**, cells or pockets. The internal divisions of a capsule or other dry seed-vessel so termed. *Vide* CAPSULA.

These cells inclose the seeds, and are either one in number, as in primrose and gentian; two, as in hen-bane, tobacco and thorn-apple; three, as in lily, hyacinth, aloe, and Adam's needle; four, as in spindle-tree, penæa and blæria; five, as in winter-green and rue; six, as in asarabacca and birthwort; eight, as in a species of flax, called *radiola*; ten, as in most species of flax; many, as in water-lily.

The term **LOCULUS** is also sometimes used to express the minute divisions in some species of *anthers* which contain the fine impalpable powder, supposed by the Sexualists to be the principal agent in the generation of plants.

LOCUSTA, Ray's term for the husky calyx of the grasses. *Gluma* is now substituted in its place. *Vide* GLUMA.

LOMENTACEÆ, (from *lomentum*, a colour, wash, or dye, à *lotum*, as *fomentum* à *fotum*—likewise Bean-meal).—The name of the thirty-third order in Linnæus's Fragments of a Natural Method, consisting of plants, many of which furnish beautiful tinctures or dyes, and whose *pericarpium*, universally (*polygala* excepted,) a leguminous pod, contains seeds that are farinaceous or mealy, like those of the bean.

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Note.—Which of these characters, or whether both in conjunction, determined Linnæus to affix the name *Lomentaceæ* to the following genera, we possess no means of ascertaining: and it seems rather strange, that Giseke and Fabricius, who lately published Linnæus's own Explanations of his Natural Orders, have not offered a single word on the subject.

Linnæan Genera.		English Names.
<i>Adenanthera</i> ,	—	Bastard flower-fence.
<i>Bauhinia</i> ,	—	Mountain-ebony.
<i>Cæsalpinia</i> ,	—	Brasiletto.
<i>Cassia</i> ,	—	Wild fenna.
<i>Ceratonia</i> ,	—	Carob-tree, or St. John's bread.
<i>Cercis</i> ,	—	Judas tree.
<i>Gleditsia</i> ,	—	Honey-locust, or triple-thorned acacia.
<i>Guilandina</i> ,	—	Bonduc, or nickar-tree.
<i>Hæmatoxylon</i> ,	—	Logwood.
<i>Hymenæa</i> ,	—	Locust-tree or courbaril.
<i>Mimosa</i> ,	—	Sensitive plant, acacia, &c.
<i>Parkinsonia</i> .		
<i>Poinciana</i> ,	—	Barbadoes flower-fence, or Spanish carnation.
<i>Polygala</i> ,	—	Milkwort.

This order, in its general appearance, so nearly resembles the pea-bloom or butterfly-shaped flowers, that, to avoid repetitions, we shall only, in this place, mention the few circumstances in which the two orders differ.

I. In all the plants of this order, except milk-wort, the filaments of the stamina are distinct.

II. The flower is not shaped like a butterfly, but is less irregular, and frequently consists of but one petal.

The LEAVES are either simple, as in judas-tree; or winged, as in the greater number.

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The SEEDS are generally marked with a circular furrow on both surfaces.

The plants of this natural order, like those of the leguminous tribe, are generally mucilaginous. From the inner bark of the greater number exudes, either naturally or by incision, a mucilaginous liquor, which, in acacia and courbaril, dries upon the plant, and becomes a gummy substance.

Brafiletto, or Brasil-wood, the *Cesalpinia Brasiliensis* of Linnæus, is much used by dyers. The tree, from which it is cut, is very thick and large, and has long branches that bear a vast quantity of little roundish leaves, of a fine shining green. The bark is reddish and thorny. The heart of the wood only is used; it is said to have the same virtue with red sanders, but is little used in medicine. Boiled in water with a little allum, Brasil-wood will strike a red dye into eggs that are boiled along with it; it is also used for colouring althea roots to clean the teeth. The raspings of Brasil-wood, infused in vinegar with a little gum arabick and allum, produce a beautiful blood-red tincture, which serves either for ink, or for dying of skins, book-covers, and the like. The same raspings, infused in water, serve for the dying of wool, which will not turn purple, nor easily suffer decay.

Cesalpinia Sappan, the *Lignum Sappan* of Rumphius, the *Tiam Pangam* of the *Hortus Malabaricus*, is a native of both Indies, and, in its general habit, resembles some of the Acacias. The tree rises with a very prickly stem, from which proceed branches that are covered with large winged leaves. The flowers are yellow, grow in clusters, and are succeeded by very broad smooth pods. The wood, termed Sappan, is of a red colour, and used in dying like Brafiletto, which it nearly resembles.

The cassia fistula tree, the fruit of which is an approved medicine, grows naturally in the East and West Indies, as well as in Egypt, and several parts of Asia. Its height, when full grown, often exceeds thirty or forty feet. The bark,

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bark, especially upon the trunk, is very much furrowed and cracked; the wood is white and soft; the tree generally branches pretty near the top, and bears several middle-sized sharp-pointed green leaves. The flowers are produced in clusters, and consist each of five petals, which are of a yellow colour and agreeable smell, and are succeeded by blackish pods, from ten to twenty inches long, and about three quarters of an inch diameter, having a seam running the whole length on the one side, and another less visible on the other. The excellence of cassia is generally estimated by the length, thickness and weight of the pods which contain it. The inside is divided into a great many cells, separated from each other by thin brittle plates or partitions, covered with a black sweet pulp; between these partitions are placed the seeds, which are small, flat and smooth. The pulp is the part which is used in medicine. It gently loosens the belly, and ejects the fæces without occasioning gripes.—M. Labat relates that the cassia-pods used formerly to be preserved as comfits, and sent to Europe, where they were administered as a gentle and agreeable purgative. The pods so preserved were gathered when extremely tender, and about two or three inches only in length; so that pod, pulp and all, were equally used, and equally esteemed. The flowers were preserved in like manner, and prescribed with success in similar disorders.—Cassia fistula is thus prepared in Egypt. The pods are collected before they are quite ripe, and carried into a very close room, in which has been previously prepared a bed of palm-leaves and straw, six inches thick. On this they lay the pods in a heap; the door is then closely shut; and the next day they sprinkle water on the heap, which is repeated the day following.—In this manner they lie heaped for forty days, till they become black; others dig a hole in the ground to put them in; but this method is greatly inferior to the former.—It is to the Arabians we owe the knowledge of the medicine in question; the Greeks and Romans being entirely unacquainted with it. The Alexandrian cassia is the best; what we principally use, however, is the American, on account of the scarcity

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of the former. The Brazil cassia is astringent while green, but purges twice as strongly as any other kind when ripe. The chief excellence of cassia is, that it is a proper purge in all inflammatory cases, which cannot be affirmed of any other known cathartic.

Senna of the shops is the leaf of the *cassia senna* of Linnæus. The shrub which produces it is about a foot high, and grows naturally in Egypt, and several parts of the Levant. The finest senna is that from Alexandria, called by the Turks palte, which pays a considerable tribute to the Grand Signor. This sort bears narrow leaves of a moderate size, lancet shaped, yellowish, and of a strong, sweet, fragrant smell.

The Tripoli senna, which is green, comes next in virtue to the Alexandrian, but is easily distinguished by its little smell.

Cassia Javanica, or broad-podded cassia, is a native of Java, Brasil, and other parts of both Indies. It has compound winged leaves, consisting of twelve or fourteen pair of lobes, flesh-coloured flowers, and very large, thick, three-ribbed pods. In America this species of cassia is commonly known by the name of Horse-Cassia, from the black, purging pulp which surrounds the seeds being generally administered in medicine to horses only, on account of its griping quality. In the shops this species is termed purging cassia of Brasil.

Kalm asserts that *Cassia Chamæcrisla*, which grows abundantly in the woods of North-America, and whose leaves resemble those of the sensitive plant, possesses likewise the quality of contracting them when touched, in common with the leaves of the latter.

The flowers of the Canada species of judas tree, commonly called red-bud tree, are frequently put into salads by the inhabitants of that country. The French too sometimes pickle them; but they have little flavour.

The wood of the common judas tree, called by the Portuguese, the tree of love, is very beautifully veined with black and green, and admits of an exceeding fine polish.

The roots of moringa, a species of *guilandina*, are scraped, when

when young; and used by the inhabitants of the island of Ceylon, and the Malabar coast, where the tree naturally grows, as those of horse-radish are in Europe. The wood dyes a beautiful blue colour.

Logwood, or Campeachy-wood, grows naturally in the Bay of Campeachy, at Honduras, and other parts of the Spanish West-Indies. It is much esteemed among the dyers and hatters for the fine purple and black colours which it produces. Pomet and Lemery have confounded this tree with that which produces the pimento or allspice. The latter is the myrtus pimento of Linnæus. *Vide HESPERIDEÆ.*

The species of acacia which produces gum-arabic, frankincense, and the *juccus acaciæ*, is the *mimosa nilotica* of Linnæus, and not the *mimosa senegal*, as was long imagined. The gum is gathered in vast quantities from the trees growing in Arabia Petræa, at the foot of Mount Sinai, whence they bring the frankincense, called by the dealers in drugs in Egypt, gum-thus, from Thur or Thor, the name of a harbour in the North Bay of the Red-Sea, near Mount Sinai; thereby distinguishing it from the gum-arabic, which is brought from Suez, another port of the Red-Sea, not far from Cairo.—Besides the different places from which these gums are brought, they differ also in some other particulars. Frankincense is pellucid, of a white colour, brittle, and easily pulverized; gum-arabic is less pellucid, and of a brown or dirty-yellow colour.

Succus acaciæ is an inspissated juice obtained by expression from the pods of the same species of acacia which produces the two valuable substances already mentioned. It is generally expressed before the fruit is ripe, and is black without, and reddish or yellowish within.

In its general habit, *mimosa nilotica* has certainly a great resemblance to that species of acacia which produces the gum-senega.—We have, therefore, the less reason to be surprized, that it should so long, by the undiscerning, have been confounded with it. They may be distinguished by the following characters. Gum-senega acacia, the *mimosa senegal*

gal of Linnæus, is covered with a white, true acacia, or acacia of the Nile, with a purple, bark. The former, too, protrudes its thorns at the insertion of the leaves by threes; the latter by pairs. Two thorns likewise accompany the doubly-winged leaves of another species of acacia, which acacia of the Nile much resembles, the *mimosa farnesiana* of Linnæus, known in the West-Indies by the name of sponge-tree, and remarkable for the fragrantcy of its flowers; but these thorns are not so long as in the true acacia, which also has its heads of flowers furnished with footstalks; whereas, in sponge-tree, footstalks are wanting to the flowers.

Gum-Senega or Senegal, just mentioned, is produced from a tree which grows plentifully in several parts of Arabia, and of Africa, particularly in Guinea and Negro-land, whence it is brought by the blacks, who carry it on their back, or on camels, in panniers made of palm leaves, to Senegal, and from this last place it is transported to the several parts of Europe. It is generally brought to us in large pieces; and, what is commonly sold for gum-arabic, is nothing else than gum-senega, broken into small pieces. The gum in question is pectoral, moistening and refreshing, gives consistence to the humours, when they become too ferous, cures rheums, and is reckoned specific in dysenteries, the piles, and other hæmorrhages. It is, however, principally in the manufacture of various stuffs, and of several dying materials, that a large quantity of it is consumed, and its chief use and excellence consist.

The Sensitive and Humble plants are arranged by Linnæus under the same genus with the acacias. These are well known to possess a kind of muscular motion, by which the leaves and stalks are contracted and fall down, upon being slightly touched, or shaken with some degree of violence. The sensibility of these plants is lodged in the young branches, in the common foot-stalk of the winged leaves, and in the nerve or middle rib to which the lobes or lesser leaves are attached. These different motions, which seem to be totally independent of one another, may be aptly enough compared

compared, by analogy, with the irritability of certain parts in animals.

The sensitive plant has two kinds of motion; the one natural, occasioned by the action of warm nourishing vapours; the other artificial, in consequence of being touched or shaken.

M. Duhamel having observed, about the fifteenth of September, in moderate weather, the natural motion of a branch of sensitive plant, remarked, that at nine in the morning, it formed with the stem an angle of one hundred degrees; at noon, of one hundred and twelve degrees; at three afternoon, it returned to one hundred; and after touching the branch, the angle was reduced to ninety. Three quarters of an hour after, it had mounted to one hundred and twelve; and, at eight at night, it descended again, without being touched, to ninety.

The day after, in finer weather, the same branch, at eight in the morning, made an angle of one hundred and thirty-five degrees with the stem; after being touched, the angle was diminished to eighty; an hour after, it rose again to one hundred and thirty-five; being touched a second time, it descended again to eighty; an hour and a half after, it had risen to one hundred and forty-five; and upon being touched a third time, descended to one hundred and thirty-five, and remained in that position till five o'clock in the afternoon; when being touched a fourth time, it fell to one hundred and ten.

With whatever body the sensitive plant is touched or irritated, it is remarkable that the sensibility resides particularly in the articulation or joining either of the branches of the common foot-stalk, or of the particular foot-stalk of each wing.

The time which a branch requires to recover itself after being touched, varies according to the vigour of the plant, the hour of the day, the season of the year, or the heat and other circumstances of the atmosphere.

The order in which the parts recover themselves, varies in like manner: sometimes it is the common foot-stalk;

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sometimes the rib to which the lobes are attached; and sometimes the lobes themselves are expanded, before the other parts have made any attempt to be reinflated in their former position.

If, without shaking the other smaller leaves, we cut off the half of a lobe belonging to the last pair, at the extremity or summit of a wing, the leaf cut and its antagonist, that is to say, the first pair, begin to approach each other; then the second; and so on successively, till all the lesser leaves of that wing have collapsed in like manner. Frequently, after twelve or fifteen seconds, the lobes of the other wings, which were not immediately affected by the stroke, shut; whilst the stalk and its wing, beginning at the bottom, and proceeding in order to the top, gradually recover themselves.

If, instead of one of the lesser extreme leaves, we cut off one belonging to the pair that is next the footstalk, its antagonist shuts, as do the other pairs successively, from the bottom to the top.

If all the lobes of one side of a wing be cut off, the opposite lobes are not affected, but remain expanded.

With some address it is possible even to cut off a branch without hurting the leaves or making them fall.

The common foot-stalk of the winged leaves being cut as far as three fourths of its diameter, all the parts which hang down collapse, but quickly recover, without appearing to have suffered any considerable violence by the shock.

An incision being made into one of the principal branches, to the depth of one half the diameter, the branches situated betwixt the section and the root will fall down: those above the incision remain as before, and the lesser leaves continue open; but this direction is soon destroyed, by cutting off one of the lobes at the extremity, as was observed above.

Lastly, a whole wing being cut off with precaution near its insertion into the common foot-stalk, the other wings are not affected by it, and its own lobes do not shut. No motion, likewise, ensues from piercing the branch with a needle or other sharp instrument.

From the preceding experiments, most of which I have
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myself made, and from many others, which, for brevity's sake, I forbear to mention, these inferences are clearly to be deduced.

I. That when the plant is in its greatest vegetative force, its motions are greater and more sensible.

II. That when the sky is serene, and the sun bright during the whole day, the plant is more sensible in the morning than at noon.

III. That in the circumstances in which they are less sensible, the leaves continue to fold and collapse, although the foot-stalks, which through age become stiff and woody, have lost their motion.

IV. That a stroke, or an irritation, produces a more forcible effect than an incision or even an entire section.

V. That a slight irritation only acts upon the neighbouring parts, and extends its influence in proportion to its force.

VI. That any given irritation acts more strongly upon some parts than on others.

VII. That whatever can produce any effect upon the organs of animals, acts upon the sensitive; as a stroke, excess of heat or cold, the steam of boiling water, that of sulphur and volatile spirits, &c.

VIII. That plunging it in water, or lodging it in the exhausted receiver of an air-pump, seems to have no other effect than that of diminishing its vigour.

IX. That there appears to be no more intimate communication betwixt the opposite lobes of a winged or pinnated leaf, than betwixt the other parts of the plant.

X. That the muscular motion of the sensitive plant is owing to a strong contraction: each footstalk seems to be terminated with a kind of joint, on which the leaves turn in all directions with surprising facility.

Different from all the kinds of sensitive plants yet known, is the *dionæa muscipula*, a native of the Swamps of North America. The plant, which is of very long growth, and rises with a naked stalk, is garnished at the bottom with eight or nine simple leaves with winged foot-stalks, which proceed

immediately from the root. In the figure and sensibility of these leaves, consists the singularity of the plant. Each leaf is almost round, *ciliated*, that is, fringed like an eye-lash, and runs out into a foot-stalk, which is not, as I said, of equal breadth throughout, but is gradually enlarged towards the top. Upon touching the leaves in cold weather, no sensible contraction ensues; in warm weather, and particularly at noon, it is very strong. But what is most remarkable of this plant is, its rare way of destroying flies and other insects which approach it. A fly no sooner touches the middle of the upper surface of the leaf, than its lobes, moving as by a spring, crush the insect to death; the *cilia*, teeth or feelers at the margin, by their inosculation, producing so tight a compression, as quickly to occasion that event. No accurate trials have yet been made with respect to the intensity of the contraction at different times, and the difference of aptitude in the plant to recover its former direction.

If we except the number of its stamina, which are ten, *Dionæa* has a considerable resemblance to the plants of the genus *Drosera*, commonly called *Ros solis* or sun-dew, in the leaves of the Cape species of which, the *Drosera cistiflora* of Linnæus, Roth, an ingenious botanist, observed a sensitive quality to reside, analogous to that of *Dionæa*, though fainter. Both genera arrange under the natural order GRUINALES. An Indian species of wood-forrel, which belongs to the same natural order, possessing a like contracting faculty, is on that account termed, by some botanists, *Herba viva*, *Herba sentiens*, *Herba mimosa Malabariensium*, and by Linnæus, *Oxalis sensitiva*.

To conclude, the cause of this and the other motions of plants is merely external. The motions themselves, therefore, are not spontaneous, as in perfect animals, which have that cause dependant on their choice and will. How many imperfect animals, however, are there, such as those in animal and vegetable infusions, whose motions, like those of the plants in question, are solely to be attributed to heat, light, and other external causes?—and again, how many, as the gall-insects, the oyster, and other shell-fish, have

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have not a motion so perceptible nor rapid as that of *Dionæa muscipula*, and the sensitive plant!

The negroes in Senegal call a large species of sensitive plant, which grows in that country, guerackiao, that is, good-morrow; because, say they, when you touch it, or draw near to speak to it, the plant immediately inclines its leaves, to wish you, as it were, a good-morrow, and to shew that it is sensible of the politeness done it. In the same country, is produced a small sensitive plant, that is rampant, not spinous, and which M. Adanson affirms to be infinitely more delicate and sensible than all the other species.

A lye-water made from the ashes of the roots of Spanish carnation is reckoned proper for bringing down the catamenia. The flowers, bruised and steeped in breast-milk, are a gentle anodyne, for which purpose they are often given, in the West Indies, to quiet very young children. The leaves of this plant are used instead of fenna in Barbadoes and the Leeward islands; and in Jamaica it is called fenna.

The root of *polygala senega*, or senega rattle-snake root, consists of many jointed fleshy tubercles or knobs, and has been long used by the Seneka Indians, both outwardly and inwardly, as an infallible remedy for the bite of that pernicious animal, the rattle-snake. The inhabitants of Virginia have, of late years, used the same plant with considerable success in many disorders proceeding from thick fizy blood.

LURIDÆ. The name of the twenty-eighth order in Linnæus's Fragments of a Natural Method, consisting of plants whose pale and ominous appearance seems to indicate something noxious in their nature and quality.

List of the Genera contained in this Order.

Linnæan Genera.		English Names.
<i>Atropa,</i>	—	—
<i>Browallia.</i>		Deadly night-shade.
<i>Capsicum,</i>	—	—
<i>Catebæa,</i>	—	—
<i>Celsia.</i>		Guinea pepper.
		Lily-thorn.

Cestrum,

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Linnæan Genera.		English Names.	
<i>Cestrum</i> ,	—	—	Bastard jasmine.
<i>Datura</i> ,	—	—	Thorn-apple.
<i>Digitalis</i> ,	—	—	Fox-glove.
<i>Ellisia</i> .			
<i>Hyoscyamus</i> ,	—	—	Henbane.
<i>Lycium</i> ,	—	—	Box-thorn.
<i>Nicotiana</i> ,	—	—	Tobacco.
<i>Pedaliūm</i> .			
<i>Physalis</i> ,	—	—	Alkekengi or winter-cherry.
<i>Sesamum</i> ,	—	—	Oily purging grain.
<i>Solanum</i> ,	—	—	Night-shade, potatoe.
<i>Strychnus</i> .			
<i>Verbascum</i> ,	—	—	Mullein.

Habit and Structure of the Plants of this Order.

Most of these plants are herbaceous and perennial. Many of them are of the masked tribe of flowers, such as fox-glove, pedaliūm, oily purging grain, celsia, and browallia; others resemble these in their general appearance, but differ from them essentially in the equality of their stamina.

The ROOTS are generally branched, sometimes tuberous.

The STEMS and BRANCHES are cylindric.

The LEAVES are generally simple and placed alternate. In browallia and pedaliūm, the lower leaves are opposite, the upper alternate. Lily thorn and strychnus have all their leaves placed opposite.

The FLOWERS are hermaphrodite. They proceed either singly, or in clusters, from the angle formed by the leaves and branches. In some species of box-thorn, they terminate the branches.

The CALYX is generally of one piece deeply divided into five parts.

The COROLLA consists of one petal, which is either bell, funnel, or wheel-shaped.

The STAMINA are four or five in number, and those either of equal lengths, as in the greater number, or unequal,

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as in fox glove, pedaliū, oily purging grain, celsia, and browallia, where two of the stamina are long and two short.

The SEED-BUD is placed above the receptacle of the flower. The style is single, and terminated by a summit, which is hemispherical, and frequently channelled or furrowed.

The SEED-VESSEL in such as have equal stamina, is a berry; in the rest, it is generally a capsule.

The SEEDS are numerous, and frequently kidney-shaped.

These plants in general have an insipid taste, and a nauseous disagreeable smell.

The greater part, particularly the fruits of deadly nightshade and thorn-apple, taken internally, if in any considerable quantity, prove mortal: causing a stupor, delirium, and convulsions. These fatal effects, it is true, may be in a great measure prevented by the speedy and copious use of emetics, and, perhaps, more certainly still, by that of acids, such as vinegar, or the juice of lemons administered in great abundance.

Alkekengi berries are diuretic.

The external application of these plants is more deserving of recommendation than their internal use. The fresh leaves of deadly nightshade applied to hard tumours and schirrous swellings on the breast have long been esteemed as an assured remedy. The ladies in Italy make use of the distilled water of this plant for beautifying their skin, whence the name belladonna, (handsome lady,) by which it is generally known among botanists. The painters in miniature prepare a very beautiful green colour from the macerated fruit.

Guinea-pepper grows naturally in both the Indies. It is raised from seed in America, Spain, Portugal, Languedoc, Provence, and even in our gardens. In all the Caribbee islands, the inhabitants use the pods in sauces; as do likewise the Negroes, who are very fond of them; whence this genus of plants had the appellation of Negroe and Guinea-pepper, by the former of which names it is generally known all over the West Indies. The seeds are intolerably acrid.

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An ointment, made of the flowers of purple fox-glove, and May-butter, is much commended by some physicians for scrophulous ulcers, which run much, and are full of matter. Taken internally, it is a violent purgative and emetic; and is, therefore, only to be administered to robust constitutions. The country people in England frequently use a decoction of it with polypody of the oak, in epileptic fits. In Italy, fox-glove is esteemed an excellent vulnerary.

Thorn-apple is used externally in burnings, and in inflammations. Of its juice is made an ointment which is excellent for the piles.

The leaves of henbane are emollient, cooling and anodyne, good for inflammations, and defluxions of hot rheum. Used internally, they are a strong poison. The roots are accounted narcotic, and but rarely used inwardly; they are frequently hung about childrens' necks, being cut to pieces, and strung like beads, to prevent fits, and cause an easy breeding of teeth. The seed, made into an electuary, with conserve of roses, and white poppy seeds, is commended by Mr. Boyle and Hælideus, against spitting of blood, as well as any other hæmorrhage. A fumigation of the seeds is said to give ease in the tooth-ach. The juice of henbane, or the oil made by infusion with its seeds, is specific in pains of the ear.

Green tobacco pounded, and mixed with unslacked lime, is frequently used by the inhabitants of the West-Indies for poisoning waters abounding with cray-fish, which, by these means, are easily taken. The plant is very liable to be destroyed at the roots, by a grub or large worm, called by the West-Indians, kitifonia; the leaves are likewise often destroyed by a small green worm of the eruca kind.

The leaves and berries of common night-shade, (*solanum nigrum*,) are used externally for inflammations and hot swellings; as also for burns and scalds.

Bitter-sweet, the *solanum dulcamara* of Linnæus, is commended for the dropsey, jaundice, and king's evil; for the former of which diseases, common fox-glove has lately, on the authority of Dr. Withering, obtained very great, and,

as far as I can learn, very deserved estimation. In Westmoreland they scrape the bark off the stalks of bitter-sweet, and boil about an ounce of them in ale, which they give to women in childbed, to help the swelling of their breasts. A decoction of the seeds of this plant is said to be serviceable in venereal complaints.—The fruit of *solanum melongena*, sometimes called the egg-plant, is often stiled the mad-apple, or apple of Sodom. This poisonous fruit is frequently attacked in the eastern countries by an insect, which turns all the inside into dust, leaving the skin only entire, and of a very beautiful colour.

The flowers of great white mullein, the *Verbascum Thapsus* of Linnæus, are used externally in inflammatory swellings. An infusion of them is prescribed internally in dysenteries and colics occasioned by sharp humours. The leaves are accounted pectoral, good for coughs, spitting of blood, and other disorders of the breast. Outwardly they are used like the flowers in fomentations or fumigations. They are reckoned a specific against the piles.—In North-America, a decoction of the roots injected into the wounds of cattle which are occasioned by worms, effectually cures them by destroying the insects. These worms are the *Larvæ* of the *Oestrus* or Gadfly, which deposits its eggs on the back of cattle—and the *Larvæ* being hatched from these eggs, cause great sores, in which they live, till they are ready for their change. In the south of Russia, they use for the same purpose the decoction of *Veratrum*, or white hellebore.—A tea is prepared from the leaves, as well as from the flowers, which is said to be useful in the dysentery. The Indians, it is believed, use the plant instead of tobacco, whence, in Pennsylvania it has obtained the name of *Tobacco of the Savages*. The Swedes in that country, says Kalm, tie the leaves round their feet and arms, when they have the ague.

LUXURIANS *flos*, a luxuriant or double flower; a flower, some of whose parts are increased in number, to the diminution or entire exclusion of others.

The parts that are augmented or multiplied in luxuriant flowers, are the flower-cup and petals, which Linnæus considers as the teguments or covers of the flower; the parts that

that are diminished or entirely excluded, are the stamina or chives, which the same author denominates the male organs of generation.

Luxuriance in flowers is capable of the three following varieties.

I. A flower is said to be MULTIPLIED, (*flos multiplicatus*) when the increase of the petals is not such as to exclude all the stamina. In this sense, flowers are properly said to be double, triple, or quadruple, according to the number of multiplications of the petals.

II. A flower is said to be FULL, (*flos plenus*) when, by the multiplication of the petals, all the stamina are excluded. Such are most of the double flowers that engage the attention of florists.

III. A flower is said to be prolific, (*flos prolifer*) which produces flowers, and sometimes leaves, from its center.

For a particular description of each of these kinds of luxuriance in flowers, the reader is referred to the articles MULTIPLICATUS *flos*, PLENUS *flos*, and PROLIFER *flos*.

Many natural orders of plants do not in any circumstances produce luxuriant flowers. Of this kind are the masqued flowers of Tournefort, excepting calve's snout; the rough leaved, umbelliferous, starry plants, and such as flower at the joints, of Ray. Some umbelliferous flowers, however, are *prolific*.

The pea-bloom, or butterfly-shaped flowers, are rarely rendered double; some instances, however, of luxuriance, are observed in a species of ladies finger, coronilla, and broom.

All luxuriant flowers are vegetable monsters. Such as are perfectly full, by which I mean the greatest degree of luxuriance, cannot be propagated by seeds; because these, for want of impregnation, can never ripen. Full flowers, therefore, are very properly denominated by Linnæus, eunuchs. This highest degree of luxuriance is very common in carnation, lychnis, anemone, stock, Indian cress, rose, marsh marigold, ranunculus, violet, pæony, and narcissus.

Flowers which do not exclude all the stamina, perfect
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their seeds. Of this kind are poppy, fennel-flower, campanula, and some others.

Some flowers, as those of the water-lily, fig-marigold, and cactus, have many rows or series of petals, without the number of stamina being in the least diminished. Such flowers are by no means to be reckoned luxuriant in the slightest degree.

Luxuriance in flowers is generally owing to luxuriance or excess of nourishment.

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MAS *Planta*, a male plant ; a plant which upon the same root produces male flowers only. *Vide infra*.

MASCULUS *Flos*, a male flower ; a flower which contains the stamina, reckoned by the sexualists the male organ of generation, but not the *stigma* or female organ.

All the plants of the class diœcia of Linnæus have male and female flowers upon different roots : those of the class monœcia, bear flowers of different sexes on the same root. The plants, therefore, of the former, are only male or female : those of the latter are androgynous ; that is, contain a mixture of both male and female flowers.

MEDULLA, the pith. *Vide STRUCTURA Vegetabilis*.

MEJOSTEMONES, (from μέῶν, less ; and stamen) : the name of a class in Haller's Natural Method ; consisting of plants, the number of whose stamina or male organs is less than that of the petals, or divisions of the *corolla*. The term is exemplified in speedwell.

MENSURA, measure. In describing the parts of plants, Tournefort introduced a geometrical scale, which many of his followers have retained. They measured every part of the plant ; and the essence of the description consisted in an accurate mensuration of the whole.

As the parts of plants, however, are liable to variation in no circumstance so much as that of dimension, Linnæus very rarely admits any other mensuration than that arising from

from the respective length and breadth of the parts compared together. In cases that require actual mensuration, the same author recommends, in lieu of Tournefort's artificial scale, the following natural scale of the human body, which he thinks is much more convenient, and equally accurate.

The scale in question consists of eleven degrees, which are as follows:

I. A hair's-breadth, or the diameter of a hair, *capillus*.

II. A line, *linea*, the breadth of the crescent or white appearance at the root of the *finger*, (not *thumb*) measured from the skin towards the body of the nail;—a line is equal to twelve hair-breadths, and is the twelfth part of a Parisian inch.

III. A nail, *unguis*, the length of a finger-nail;—equal to six lines, or half a Parisian inch.

IV. A thumb, *pollex*, the length of the first or outermost joint of the thumb;—equal to a Parisian inch.

V. A palm, *palmus*, the breadth of the palm, exclusive of the thumb;—equal to three Parisian inches.

VI. A span, *spithama*, the distance between the extremity of the thumb, and that of the first finger, when extended;—equal to seven Parisian inches.

VII. A great span, *dodrans*, the distance between the extremity of the thumb, and that of the little finger, when extended;—equal to nine inches.

VIII. A foot, *pes*, measuring from the elbow to the basis of the thumb;—equal to twelve Parisian inches.

IX. A cubit, *cubitus*, from the elbow to the extremity of the middle finger;—equal to seventeen inches.

X. An arm-length, *brachium*, from the arm-pit to the extremity of the middle finger;—equal to twenty-four Parisian inches, or two feet.

XI. A fathom, *orgya*, the measure of the human stature; the distance between the extremities of the two middle fingers, when the arms are extended;—equal, where greatest, to six feet.

METEORICI. *Vide* VIGILÆ.

METHODUS,

METHODUS, a mode of arrangement from certain agreements or circumstances of resemblance ; a method.

Botanists have distinguished two kinds of methods in arranging vegetables ; the natural and the artificial.

A natural method is that, which, in its distribution, retains all the natural classes ; that is, such into which no plants enter that are not connected by numerous relations, or that can be disjoined without doing a manifest violence to nature.

An artificial method is that whose classes are not natural, because they collect together several genera of plants which are not connected by numerous relations, although they agree in the characteristic mark or marks, assigned to that particular class or assemblage to which they belong.

An artificial method is easier than the natural, as in the latter it is Nature, in the former the writer, who prescribes to plants the rules and order to be observed in their distribution. Hence, likewise, as Nature is ever uniform, there can be only one natural method : whereas artificial methods may be multiplied almost *ad infinitum*, according to the several different relations under which bodies are viewed.

To form a precise idea of the nature and utility of vegetable arrangement, whereby only a proper estimate can be made of the merits and defects of particular systems, we must look backward, and trace method and arrangement from its first and simplest rudiments in botanical writings, to its more perfect state under Cæsalpinus and his successors.

Although it may be presumed that every plant possesses virtues which are proper to it, we have not been able to ascertain them with any degree of precision, unless in seven or eight hundred species, one half only of which are used in medicine.

If then, in order to be an expert botanist, it were sufficient to know this limited number of plants, by their names and their virtues ; inspection, repeated examination, and comparison, would, perhaps, be the only necessary means for attaining such knowledge. A botanist would acquire information in the same manner as a traveller does of the

countries through which he passes, or as a labourer learns to distinguish the few plants which come under his observation. It would be superfluous to have recourse to other means.

But, even with the proviso we have mentioned, such a method would have its inconveniences. It would be tedious, irksome, and always uncertain. The resemblance of several useful and wholesome plants to such as are noxious and useless; the impossibility of distinguishing such similar plants, without a distinct idea of each; the external agreements of several species, whose properties are essentially different; the great danger of committing mistakes; and the ill consequences of such mistakes: these, and other circumstances, concurred to suggest the necessity of having recourse to divisions determined by accurate and distinct characters.

The necessity of divisions becomes still stronger, if we extend our views, and, not satisfied with the few medicinal plants which our own country affords, embrace the whole of vegetable nature. Here memory must unavoidably sink under the mighty load, if observation, reasoning, and method, did not bring it timely assistance.

By observation, we distinguish the external marks or characters which are obvious in the appearance of natural bodies: by reasoning, we determine the relations which subsist betwixt them: and by method, we collect, under one head, similar bodies, and separate such as differ. Hence arise divisions and subdivisions, which the mind seizes with avidity, and retains ever after.

Thus it is, that the study of plants, which at first seems, and for a long time actually was, a simple nomenclature, becomes a science; and this science is called botany. Agreeably to this idea, Boerhaave defines botany to be a part of natural knowledge, by means of which, plants are most certainly and easily known, and engraved on the memory.

It was not, however, till after many ages, and much observation, that botany began to be considered in this philosophical view: though divisions of a certain kind have always been admitted, in order to facilitate the knowledge of plants.

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Thus, vegetables have been successively distinguished from the place of growth, into aquatic, marine, wild, and domestic ; from the time of flowering, into spring, summer, autumnal, and winter plants ; sometimes too, less philosophically still, they have been arranged by the names of the authors who first discovered or described them ; and not seldom, according to the letters of the alphabet.

Theophrastus, the scholar of Aristotle, arranges plants, from their qualities and uses, into esculent grains, succulent plants, and pot-herbs ; Dioscorides, into aromatic, alimentary, medicinal and vinous plants.

These philosophers, studious to render botany useful, were ignorant of the means to facilitate its knowledge. Their vague and uncertain divisions can, at best, assist *his* memory, who already knows the plants they describe, but will never conduct to the knowledge of them. They suppose every thing ; they teach nothing.

The same may be affirmed of all the divisions or methods founded solely on the qualities or medicinal virtues of plants. These methods, generally adopted by physicians, with a view to confine the science to its true objects, have always the contrary effect, by confounding things which ought to be distinguished.

Three reasons, according to M. Adanson, concur to render every such method uncertain and dangerous.

I. The same plant has often several different virtues.

II. The different parts of a plant have often different, and even opposite virtues ; so that, according to the rules of strict arrangement, the root should be placed in one division, the flower in another, and the leaf in a third. Thus in buckthorn, and distaff-tree, the leaves are astringent, the fruits purgative. In rhubarb, monk's rhubarb, and common knot-grass, the roots are purgative, the leaves and seeds binding.

III. Several plants, characterized by a particular virtue, possess it to such a degree of strength or weakness, that we may reasonably expect very different effects from this difference of intensity in the same quality. Thus in the natural

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family of lipped flowers, the aromatic virtue which is common to the whole tribe is possessed in the highest degree by rosemary, sage, mint, marjoram, balm, and hyssop; in a less degree, by germander, and self-heal: and becomes almost insensible in sage-tree and base hore-hound. It is the same with other qualities; tinctures, for example. Thus the roots of most of the pea-bloom tribe, and starry plants, (*stellatæ*) afford a dye or tincture more or less lively; in the same manner, a coloured juice, which is more or less vivid, is procured from the leaves and flowers of that numerous tribe of plants called compound. The knowledge of this common quality, however, is so far useful, that on the discovery of a new plant in any particular family, we are led by analogy to explore those properties in it which are known to be possessed by the family to which it belongs.—It was on this principle that M. Adanson drew from a species of indigo at Senegal, which had escaped observation, a fecula of an azure blue colour, different from that of America, and perhaps superior in beauty.

From these observations, which are furnished by experience, it follows as a corollary, that the principal virtue of any plant is that which is found to be possessed in common by all the plants of the family to which it belongs; and that, although the virtue in question should not be most predominant in a particular species. It is for this reason that the family of the purslanes may be regarded, in a particular manner, as cordial; for although many of that tribe are likewise astringent, yet the former is the prevailing or general virtue.

Upon the whole, divisions drawn from the virtues of plants, far from enlightening botany, plunge it anew into a chaos of confusion and ignorance. We allow them their use in the *materia medica*, where plants are distinguished by their sensible qualities, into bitter, acid, salt, sweet, and acrid; and by their virtues, into purgative, aperient, sudorific, hepatic, &c. But this is not botany; it is the *materia medica*: the one conducts to the knowledge of plants; the other indicates their use: the first ought, consequently, to

to precede and direct the second; but cannot itself be enlightened, without divisions founded upon signs more determinate in their nature, more constant, and sensible to the eyes of the observer.

In the progress of the science, botanists have endeavoured to distinguish these signs, to fix their characters, and ascertain their relations. The most apparent would, doubtless, first attract regard; such are the size and duration of plants; circumstances from whence arose the first distinction of vegetables into herbs and trees: that is, into plants of a tender succulent nature, which lose their stems during the winter; and into such as are of a solid consistence, woody, and whose stems subsist during the winter. See ARBOR, where this distinction, as likewise that of shrubs and undershrubs, is particularly discussed.

Ancient, however, as this distinction is, and numerous as are the authors who have adopted it, it can be of very little assistance alone in determining plants with precision; as we must wait at least a full year to be ascertained of the duration of a particular plant. Some annuals, too, have a woody sort of stem, which may cause them to be mistaken for shrubs; nay more, some plants, which in a warm climate are shrubby, become herbaceous, and even annual, (as the *ricinus* or *palma christi*;) when removed into a cold one.

The same insufficiency to serve as foundations of a method will be found in the roots, and still more in all the variable qualities of vegetables, such as taste, colour, and smell, which are modified in a thousand different shapes, by culture and climate.

The leaves being earlier, more apparent, more common, and more permanent than the flowers, sooner engaged attention: but in proportion as botany made advances, the uncertainty of characteristic marks drawn from the leaves manifestly appeared. In the course of these advances, it has been found that the leaves vary in their forms, even on the same individual; that the same plant, under a different climate, with different management, or sown at different seasons, shall be covered with leaves which have not the smallest re-

resemblance to each other; that plants otherwise extremely similar in their appearance, have leaves absolutely dissimilar; and that others, whose figure, qualities, and habit, differ essentially, are so remarkably similar in their leaves, that confusion must be unavoidable, if the characters of the leaves are made the foundation of primary divisions. Thus a species of veronica or speedwell bears the leaves of the germander; which, in like manner, bears those of the oak.

Notwithstanding these discouraging circumstances, a system of plants founded upon the leaves has been attempted by two ingenious moderns, both Frenchmen; M. Sauvage, in a work entitled *Methode pour connoitre les Plantes par les Feuilles*; and M. Duhamel du Monceau, in his *Traité des Arbres*. These gentlemen do not, however, mean to fix precise characters from the leaves; their sole intention is to present us with new relations, and thereby facilitate the distinctions which they suppose determined by means more certain and methodical. They have even set out with declaring the insufficiency of the leaves for this purpose.

Methods having hitherto been attempted to be erected without success, occasioned by the insufficiency of the leading characters, men had recourse to such as were more solid, more constant, and more general. These were named natural characters, and are drawn from the habit or general appearance of the plant; and from the combination of the most essential parts of vegetation, the flower, fruit, seed, disposition of the stem, and branches, &c. All the accidents of each of these parts, viewed and compared together, led to natural and determinate divisions.

These divisions, founded upon numerous, permanent, and sensible relations, are called natural orders, or natural families. Such are the grasses; the cross-shaped, umbelliferous, liliaceous, pea-bloom, and lipped-flowers. Each plant in every one of these natural families collects sensible characters, which are essentially the same in all the plants of the family to which it belongs.

The families alluded to seem to have been truly distinguished by nature: and botanists have successively determined a
great

great number of them. If they had been able to arrange, in like manner, all the species of known plants, they would have discovered a natural method, the great *desideratum* in botany, and which has in vain engaged the attention and researches of every naturalist since the origin of the science.

Such a natural method would be a kind of table, exhibiting the gradual progression which nature has observed in the formation of vegetables, as in that of all other beings. Many of the intermediate steps of this progression; several links in the great chain, are not known. A great number of plants cannot find a place in the natural families; devoid of uniform relations betwixt themselves, they cannot constitute new families; they remain, in some sort, solitary; and would again involve the science in confusion, if Art had not supplied what Nature refused to grant.

Artificial methods were invented; and characters established, which, although less sensible, and less numerous than the natural characters just mentioned, were simpler, more general, and equally invariable.

Upon these general characters, scrupulously observed, and minutely examined, primary divisions have been founded, which are again subdivided from an attention to other characters less apparent.

These divisions, which form a kind of scale or progression, are characterized by different names; as classes or families; orders or sections; genera; species; varieties; and the individual; and all together constitute what is called a METHOD; and, when the principles upon which the divisions proceed, are fixed and determined,—a SYSTEM.

As this subject is of the utmost importance to the beginning botanist, I must beg leave to dwell upon it, and to trace the order of bodies into genera, species, varieties, and individuals, both in the investigation and the enunciation of truth; that thence the general laws of method may be established.

Every natural body differs so from all others which are exposed to our senses, that it may be considered as singular

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or individual. Thus a dog, a sparrow, a fly, a tulip, a diamond, nitre, are all bodies which may be considered in themselves, and without relation to others, as often as they solicit the senses.

Many individuals of the same kind give an idea both of similitude and plurality. The similitude, therefore, of several individuals constitutes a SPECIES OR KIND,—an abstract or general term, to which all these individuals, on account of their agreement in certain characters, may be referred.

But two bodies are never observed of similar properties in every respect; and, therefore, the idea of a species would never arise, were not certain characters distinguished from others, the essential from the merely accidental. The essential characters never vary in the same species; the accidental sometimes vary in the same species, from certain accessory causes, which are not always and necessarily present in a natural body. These accidental characters give rise to the varieties, which are not, by any means, to be confounded with the species. Thus of the species of dogs, different breeds, as the greyhound, spaniel, and beagle, constitute the varieties; all together make up the species of that animal. In the same manner, difference of colour, magnitude, scent, taste, and other attributes, exhibits varieties in the different species of vegetables.

In a number of species accurately distinguished, some similar characters are found: these beget the idea of a GENUS or RACE, a general term, expressing a similitude of species, from an agreement in some characters. Thus, to take an example from botany. Of various plants, which, in spring, are seen in our meadows, and are considered as different species, from the appearance of their leaves, which are either differently cut, or of different figures, if intire; the petals are of an equal number, (five) the stamina and styles numerous, and at the claw or bottom of each petal is a small prominence or pore. These resemblances in the parts of the flower, in such a number of different species, constitute a GENUS, which in the instance I have been giving, called *genus ranunculi*: and all plants which agree

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in the characters just mentioned are referred to that genus.

Similitude admits of almost innumerable degrees. Accordingly, orders and classes, higher degrees still, are constituted from genera, by attending to the agreements of a number of genera in the first case, and of a number of orders in the second. These divisions, however, are altogether arbitrary, according to the points of resemblance under which we consider bodies.

From what has been said, it is clear how natural things are to be investigated, and how communicated. The discoverers of natural things evidently proceeded from the consideration of individuals to that of species and genera, and so on to the higher arbitrary divisions: and a like method do all adopt who would improve natural knowledge by further discoveries.

But when invented and proposed to be communicated to others, we take a different method, and beginning with the higher arbitrary divisions, as classes and orders, descend to genera, species and varieties, in a direction retrograde to what we followed in invention. This method is found most adapted to the capacity of learners.

This general idea of the divisions admitted into artificial methods or systems, will be better understood by the application which we intend to make of it to particular methods. At present I would observe with Cæsalpinus, that, "by means of these distinctions, the vegetable kingdom is divided like a large body of troops. The army is divided into regiments; the regiments into battalions; the battalions into companies; the companies into soldiers." Vegetables are ranged in classes, which are divided into orders; the orders consist of genera; the genera of species; and, as the term regiment is an aggregate of soldiers, so the term class, or, to go higher still, system, is nothing else than an aggregate of species.

To be convinced of the great utility of artificial methods in conducting to the knowledge of plants, let us suppose the number of known species of plants to be twelve thousand,

land, and the number of classes in a certain known method to be twenty-four. A plant is presented to me which I never saw. I immediately look for the general character which serves to distinguish each of the twenty-four classes. This being found, and consequently the class of the plant being determined, I have no longer to look for my plant among twelve thousand, but, on a supposition that each class contains an equal number of genera, among five hundred only, the twenty-fourth part of the number just supposed. I next look for the character of the order, the second division, which being likewise found, will reduce this number to about an hundred. The character of the genus, which I next explore, will reduce this still further, to twenty, for instance: that of the species determines the plant in question.

This method of proceeding is similar to that which is observed in turning over a dictionary, where, in searching for a word, as SPACE, we first look for the letter S, next P, then A, and so successively the C and E. S may represent the class; P the order; A the genus; C the species, and E the variety.

It was long, however, before artificial methods attained that degree of accuracy, which we have been describing. The determination of the general and particular characters which constitute such methods, required observations so much more exact and numerous, as their principal merit consists in collecting the greatest possible number of natural families; as they must at the same time agree with all known plants: and, as botany, since the discovery of the new world, has more than doubled its former riches.

Lobelius in 1570; Clusius, in 1576, and Dalechamp, a physician of Lyons, in 1587, gave successively very good descriptions of a large number of plants, but were greatly puzzled in determining what parts were most proper for furnishing classic and generic characters. Gesner was the first who suggested the propriety of the parts of fructification for this purpose; and Casalpini, a physician of Pisa, first arranged plants according to Gesner's idea, and began the period of Systematic Botany.

In 1583, he described eight hundred and forty plants, and divided them into fifteen classes, by a method, in which, after admitting the general distinction formerly mentioned, of herbs and trees, he draws his distinctive characters from the parts of fructification, particularly from the seed-vessel; the number of cells; the number, form, and disposition of the seeds; the situation of the radicle in the seed; and other circumstances. These fifteen classes are subdivided into forty-seven sections or orders, from an attention to the disposition, situation and figure of the flowers; the situation of the radicle or embryo-plant in the seed; the number of lobes or seed-leaves; the fruit or seed-vessel; the colour of the flowers; the form of the leaves and roots, and some other circumstances. Cæsalpinus's method then is not founded solely upon the fruit, as has been imagined, but combines with several other parts of fructification, various modifications of parts, which, like the root and leaves, are connected neither with the flower nor fruit. The situation of the radicle or embryo-plant in the seed, as likewise the number of lobes or seed-leaves, are said to have been first observed and accurately distinguished by this author.

The same botanist distinguished with great accuracy the cells and partitions of seed-vessels. He made no methodical distinction of genera; each species being described as a distinct genus.

Contemporary with Cæsalpinus flourished Acosta, a Spaniard; Camerarius, a German; Porta and Prosper Alpinus, both Italians. The latter wrote an excellent treatise on the plants of Egypt; as likewise two separate dissertations on rhubarb and balsam.

Porta, in 1588, published a work, entitled, *Phytognomica*, or the *Astrology of plants*. In this motley collection, vegetables are divided into seven classes, from their place of growth, their resemblances and relations to men and animals, and their relations with the stars. These classes are subdivided into forty-seven sections.

According to Porta, plants, which have any of their parts
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like a liver, are proper for the diseases of the liver; such as resemble eyes, are good for the eyes; and so of others.

This idea, says a French writer, and the method founded upon it, is very ingenious; and contains, at least, as many truths as falsehoods.

In 1592, Fabius Columna, a Neapolitan, improved upon the distribution of the genera, and invented most of the terms now used for denominating the parts of fructification. His engravings on copper are esteemed excellent.

Columna published his *Phytobasanus*, at Naples, in 1594, with thirty-five figures. The first part of his "*Ecphrasis minus cognitarum stirpium*" was published in quarto, at Rome, in 1610, with one hundred and fifty-six figures; and the second part at the same place in 1616, with forty-three figures. This author is said to have been drawn into the study of botany, by some experiments on Valerian to cure himself of the epilepsy. He followed no particular method, but treated of plants historically, or without order.

In 1596, Caspar Bauhin, a Swiss, fixed, with indefatigable labour, in his *Pinax*, the name of every plant then known and described; and in 1650, his brother, John Bauhin, wrote his *Universal History of Plants*, in three volumes folio. In this work are described five thousand two hundred and sixty-six plants, divided, not very methodically, it must be allowed, into forty classes. To this "*par nobile fratrum*" is botany indebted for a considerable part of its progress; yet the rage, which still subsisted of forming divisions from the virtues and uses of plants, greatly retarded the introduction of those orthodox methods, as Linnaeus terms them, which alone can bring the science to perfection.

In this period of botany, gardens were erected at the public expence, and opened for the convenience of such as addicted themselves to the study of plants; a circumstance which greatly accelerated the progress of the science.

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The first botanical garden was opened at Padua in 1540, by the family of the Medici.

That at Bologna and Pisa in 1547.

That at Montpellier in 1598.

That at Paris in 1626.

That at Edinburgh, in 1675, by Sir Andrew Balfour, president of the Royal College of Physicians.

That at Upsal, in Sweden, in 1657.

That at Oxford in 1683.

That at Leyden in 1677.

That at Amsterdam in 1682.

That at Utrecht in 1725.

Besides these and many other academical and public gardens which might be enumerated, there were three erected in Italy, one in France, one in England, five in the Low-Countries, eight in Germany, and two in Sweden by private gentlemen.

In 1680, Robert Morison, a native of Aberdeen in Scotland, published at Oxford, an Universal History of Plants, in which he retains, under a new form, the divisions of Cæsalpinus, founded upon the parts of fructification, particularly the fruit.

Morison was long an exile in France, where he applied himself to botany, and other branches of physic, and was appointed superintendant of the gardens at Orleans.

Upon the restoration of Charles the Second, he was invited over to England by that monarch, who appointed him Regius Professor of Botany at Oxford.

The History of plants was completed by Mr. James Bobart, after Morison's death, and published in folio, in 1699, with one hundred and ninety-five figures on copper.

Morison's Method, says Mr. Adanson, although not very elaborate, is extremely difficult in practice, and has not, on that account, been followed by any author, except Bobart, who completed his large work on plants, and the anonymous author of a work published in octavo, at Oxford, in 1720, under the title of "*Historiæ Naturalis Sciagraphia*." His arrangement

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arrangement of the umbelliferous plants is very ingenious, and has been followed by most succeeding authors.

John Ray, or Wray, was born near Braintree in Essex, in 1628, and early applied himself to the study of natural history. In his *Natural Method of Plants*, published in 1682, he suggested an idea or plan of arrangement, much superior to that of either Cæsalpinus or Morison, and, perhaps, in many respects, inferior to none of the boasted methods that have appeared since his time. This plan Mr. Ray did not execute till 1686, when he published his *General History of Plants*, in which are described eighteen thousand six hundred and fifty-five species, including varieties. His method is founded upon the general habit or structure of plants; their size and duration, as herbs and trees; their greater or less degree of perfection; the place of growth; the number of seed-leaves, petals, capsules, and seeds; the situation and disposition of the flowers; the form of the leaves; the absence or presence of the flower-cup and petals; the substance of the leaves and fruit; and the difficulty of arranging and classing certain plants. From a combination of these circumstances, Ray has arranged all vegetables into thirty-three classes, which are subdivided into one hundred and twenty-five sections. His method is extremely elaborate, and collects more natural classes than any artificial system I am acquainted with; it is, however, extremely difficult in practice, and, therefore, now studied more for curiosity than use. It would have succeeded better, says M. Adanson, if Ray had been as great a botanist, as he was a learned writer, and judicious compiler.

In 1700 Ray published an edition of his method, augmented and corrected after that of Tournefort, which had appeared in 1694. Some pretenders to botany, envious of the success which these great men had justly obtained, endeavoured to embroil them, though without effect; for it appears that they always lived in the strictest intimacy and friendship.

Ray's method was followed in 1707 by Sir Hans Sloane, in his *History of Jamaica*.

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In 1713, by Petiver, in his "*Herbarium Britannicum*."

In 1724, by Dillenius, in his enlarged edition of Ray's "*Synopsis Stirpium Britannicarum*."

In 1727, by Martyn, in his "*Methodus Plantarum circa Cantabrigiam*."

Christopher Knaut, in his *Enumeration of the Plants which grow round Hal, in Saxony*, published in 1687, invented a method, established, in part, upon the fruit, which differs but little from that of Ray. It is exceedingly complex and difficult.

Paul Hermannus, Professor at Leyden, Magnolius, Professor at Montpellier, and Rivinus, Professor at Leipsick, successively enriched botany with ingenious methods and new observations;—the dawn of the day, which the illustrious Pitton de Tournefort was about to diffuse over every branch of the science.

This great reformer of botany was born at Aix, in France, in 1656. He was early designed for the church, but, upon the death of his father, he quitted all thoughts of embracing that profession; and, about two or three years thereafter, went to Montpellier, where, along with botany, he studied anatomy, and other branches of physic, with great diligence.

In 1694, he published his *Method*, which consists of twenty-two classes, and is founded on the regularity and figure of the petals or coloured leaves of the flower. The perspicuity and precision of this method, gave it deservedly, from its first appearance, the preference above all which had preceded it.

By the acknowledgement of all botanists, Tournefort has introduced into the science, order, purity, and precision, by delivering the best and most certain principles for establishing the genera and species; and by founding on those principles the most accurate, and, if we except that of Rivinus, the easiest method which has yet appeared. His object was not, as he himself declares, to establish an universal method, a thing which he considered as impossible to be erected upon hypothetical and arbitrary principles; but to trace that method which appeared to him

most convenient for obtaining an easy and accurate knowledge of vegetables. His twenty-two classes, which, by the way, might have been reduced to seventeen, are subdivided into six hundred and ninety-eight genera, which are again subdivided into ten thousand one hundred and forty-six species and varieties.

Upwards of twenty authors of eminence have successively adopted Tournefort's method, after making the alterations, which new discoveries, and the correction of trivial errors, rendered necessary. A list of the most noted of these authors is given under the article COROLLISTÆ, which see.

The facility of acquiring Tournefort's Method had procured it an almost universal reception, when Linnæus proposed his Sexual System, and, assisted by the works of his predecessors, and much observation of his own, established, by indefatigable labour, a method, which has since attracted the attention of the learned all over Europe.

Charles Von Linné was the son of a clergyman in Smolandia, a province of Sweden. He applied himself very early to the study of Natural History, and made such progress, that before he reached his twenty-third year, he was judged capable of assisting Rudbeckius, Professor of Botany at Upsal, in teaching his class.

In 1731, he introduced his method, then in embryo, into the garden at Upsal, with success. After this he was employed by the Upsal society to travel through Lapland, Norway, and other northern parts of Europe, in quest of plants, and other natural curiosities. In 1735, he travelled through Denmark, Sweden, Germany, England, and Holland, with the same view; and published his "*Systema Naturæ*," at Leyden, in the same year.

In 1736, he published his "*Fundamenta Botanica*," which contain the rudiments of his method; these he afterwards enlarged, and published under the title of "*Philosophia Botanica*." When Linnæus was in London, he proposed his method to Sir Hans Sloane, President of the Royal Society, who rejected it.

In 1742, Linnæus was chosen Professor of Botany at Upsal.

He was afterwards appointed Chief Physician to the King of Sweden, knighted, and ennobled. The idea upon which Linnæus's method is founded, is as old as the time of Theophrastus, and supposes that in plants, as in animals, generation is accomplished by the concurrence of the two sexes. The stamina or chives he considers as the male organ of generation; the pistillum or pointal as the female. From the number, situation, proportion, union, and absence of the stamina are formed his primary divisions or classes; and from the number and other circumstances of the pointal or female part, arise most of the secondary divisions or orders.

Such is the general idea upon which the celebrated Sexual System of Linnæus proceeds. A particular delineation or analysis of it is prefixed to this work; and a just estimate of its merits and defects may be obtained by a careful perusal of the criticisms on his several classes, to be found in the present work, and an exact comparison of those classes with the primary divisions of other Systematic writers, Ray and Tournefort in particular.

The authors who have followed Linnæus's Sexual Method are,

In 1739, Gronovius in his *Flora Virginica*.

In 1755, the same author in his *Flora Orientalis Raulowfij*.

In 1756, Brown in his *Natural History of Jamaica*.

In 1762, Mr. Jacquin in his *Enumeratio Plantarum Americanarum*.

In the same year, Mr. Hudson, apothecary, in London, in his *Flora Anglica*. In this useful book, Mr. Hudson gives the generic and specific characters of every known plant that is native in England; the time of flowering; the English name; the place of growth; and its duration, whether annual, biennial, perennial, woody, or herbaceous.

The Sexual Method, when first proposed by its author, gained little approbation. This was certainly owing to the great reputation which Tournefort's had obtained, and which nothing but the conviction of superior ingenuity, merit and industry,

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industry, could possibly diminish. Without entering, at present, into a detail of the respective merits of these two illustrious botanists, let us endeavour to derive instruction from the diversity of their principles and methods.

The order of nature is alone without imperfection; an order, however, which we have not yet been able to detect. Every artificial method has necessarily its defects, and its obscurities. But two methods, such as those of Tournefort and Linnæus, so well conceived, so judiciously executed, and founded upon observation, must enlighten each other mutually. They cannot err on the same subject; if the one wanders but for a moment, the other immediately sets him in the right path.

The same reflection occurs in comparing several other learned and ingenious methods; such as those of Haller, Van Royen, Sauvages, Ludwig, Adanson and DuRoi; and the observations scattered through the works of Jussieu, Guettard, Dillenius, Louis Gerard and others; so certain is the maxim with which I shall conclude this article, that a multiplicity of methods and observations compared together, leads us to distinguish plants under a greater number of relations, and consequently conducts us, with greater ease, to their knowledge.

MISCELLANÆ. The name of the fifty-fourth order in Linnæus's Fragments of a Natural Method, consisting of the following plants, which not being connected together by numerous relations in their habit and structure as the natural families, are assembled into one head, under the title of Miscellaneous Plants. Such of them as seem most nearly connected, we have placed together, and distinguished from the others by a letter of the Greek alphabet; a method which we shall observe on other similar occasions.

Linnæan Genera.			English Names.
α	<i>Daliscia</i> ,	—	Bastard hemp.
	<i>Reseda</i> ,	—	Bastard-rocket, dyer's-weed.
β	<i>Poterium</i> ,	—	Garden-burnet.
	<i>Sanguisorba</i> ,	—	Greater wild-burnet.

γ *Lemna*,

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Linnæan Genera.

English Names.

γ	<i>Lemna,</i>	—	—	Duck-meat.
	<i>Pistia,</i>	—	—	Kodda-pail.
δ	<i>Coriaria,</i>	—	—	Myrtle-leaved sumach.
	<i>Empetrum,</i>	—	—	Black-berried heath, or crow-berries.
ε	<i>Achyranthes,</i>	—	—	Cadelari.
	<i>Amaranthus,</i>	—	—	Amaranth, or flower-gentle.
	<i>Celosia,</i>	—	—	Cock's-comb.
	<i>Gomphrena,</i>	—	—	Globe-amaranth.
	<i>Iresine.</i>			
	<i>Phytolacca,</i>	—	—	American night-shade.
ζ	<i>Nymphæa,</i>	—	—	Water-lily.
	<i>Sarracenia,</i>	—	—	Side-saddle flower.
η	<i>Cedrela,</i>	—	—	Barbadoes cedar.
	<i>Swietenia,</i>	—	—	Mahogany.
θ	<i>Corrigiola.</i>			
	<i>Lineum.</i>			
	<i>Telephium,</i>	—	—	True orpine.

Dyer's weed, or wild woad, by some called weld, is chiefly esteemed by the dyers for its fine yellow colour. In medicine it is little used; yet the root is esteemed aperient, and sometimes given in decoction, and the juice of the plant promotes perspiration. This is now generally believed to be the plant with which the Picts, the ancient inhabitants of Britain, painted their bodies; the rather, as the plant in question is a native of this island; whereas woad, (Isatis of Linnæus) the plant contended for by some, has been introduced into Britain since that time.

The flowers of Egyptian reseda, termed likewise, mignionette of Egypt, have a very sweet, agreeable smell.

Burnet is of a heating, drying nature, cordial and alexipharmic; in summer the leaves are used in cool tankard, to give the wine an agreeable flavour. The powder of the root is commended against spitting of blood, bleeding at the nose, dysenteries, and diseases attended with violent secre-

tions. In winter and spring, the young tender leaves are used in fallads. Greater wild burnet, stript of its bark, is sometimes applied with success to recent wounds; the dried powder stops the progress of cancerous ulcers.

Myrtle-leaved sumach is much used in the South of France, where it naturally grows, for tanning of leather, whence it has been termed by some, tanner's sumach. The same plant dyes a beautiful-black colour. The berries are dangerous, and when eaten, generally occasion vertigoes, and epilepsies. The old leaves, when browsed upon by cattle, have the same effect; the young leaves have no such pernicious quality.

The leaves and roots of American night-shade, (the *Physalacca decandra* of Linnæus) sometimes termed pork-physic, are anodyne. The juice of the root is a violent purgative, and therefore to be used with caution; the berries, when ripe, give a very beautiful purple-red tincture. The leaves are used externally in discussing painful swellings. In North America the inhabitants boil the young shoots, and eat them like spinach. The Vignerons in Portugal, says Mr. Miller, for many years made use of the juice of the berries of this plant for mixing with their red port wines, to which it gave a deep colour, and when a great quantity was added, a very disagreeable taste. A complaint of this practice having been made to his Portuguese majesty, he commanded that the stems of this plant should be cut down before they produced berries, to prevent the further adulteration of the wines. *Vide* MILLER'S GARDENER'S DICTIONARY, *Voce* PHYTOLACCA.

The wood of Barbadoes cedar, (*cedrela odorata*), and of mahogany, (*Swietenia mahagoni*), has an aromatic, balsamic, and agreeable smell. The former is employed in the West-Indies, on account of its pliancy, for making canoes of a single piece, as well as planks, and shingles for covering houses, and household furniture. There are canoes in these places, says Miller, formed out of the trunks of these trees, which are forty feet long, and six broad. As the worms are apt to eat the wood of the Barbadoes cedar, it is not proper
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for building of ships, though frequently used both in building and sheathing vessels. The same objection does not lie against mahogany, which is less liable to be attacked by worms than oak; so that mahogany ships are preferable to any other, not only for the reason just mentioned, but because the wood is very durable, and buries gun-shot without splintering. The excellency of mahogany for all domestic uses, is too well known in England to require any eulogiums in this place.

MODUS *florendi*, a mode of flowering. *Vide* INFLORESCENTIA.

MONADELPHIA, (from *μονος*, alone; and *ἀδελφία*, a brotherhood,) a single brotherhood. The name of the sixteenth class in Linnæus's Sexual System, consisting of plants with hermaphrodite flowers; in which all the stamina, or male organs of generation, are united below into one body or cylinder, through which passes the pistil or female organ. The particular classic characters of the plants in question, besides that expressed in the title, have been already given under the article COLUMNIFERÆ; to which natural order, most of the plants in the class *monadelphica* are referred. The principal of these characters are the following.

I. A permanent flower-cup, and generally double.

II. Five heart-shaped petals, closely embracing one another above, so as to form the appearance of a single petal.

III. The *anthers*, or tops of the stamina, kidney-shaped, and slightly attached to the filaments by the middle.

IV. The receptacle of the fructification, or that to which the flower and fruit are attached, is prominent in the middle of the flower.

V. The seeds, kidney-shaped.

The orders of the class are five, from the number of united stamina.

Hermannia, waltheria, and melochia, have five stamina.

Crane's-bill, connarus, and hugonia, have ten.

Brownæa has eleven.

Pentapetes, twelve.

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Silk cotton-tree, Æthiopian four-gourd, Indian mallow, napæa, marsh-mallow, hollyhock, mallow, lavatera, bastard mallow, urena, cotton, Syrian mallow, stewartia, and camellia, have numerous stamina.

In some species of geranium or crane's bill, the stamina are distinct. In others, the filaments are alternately furnished with anthers.

A species of silk cotton tree, termed by Linnæus, *bombax pentandrum* has only five stamina.

The genera of this class were formerly distinguished by the fruit; which being found insufficient, several botanists had recourse to the leaves as an auxiliary. Linnæus distinguishes the genera chiefly by the calyx, which is generally double in plants of the last order.

MONANDRIA, (from *μονος*, alone, and *ἀνρ*, a man or husband); the name of the first class in Linnæus's Sexual System; consisting of plants with hermaphrodite flowers, which have only one *stamen* or male organ.

This class is subdivided, like the other plain classes in the same system, from the number of the styles or female organs, into two orders.

Indian flowering-reed, ginger, *costus*, alpinia, Indian arrow-root, turmeric, *kæmpferia*, *thalia*, American hogweed, jointed glass-wort, and hippuris, have only one style.

Tickseed, callitriche, blite, and cinna, have two styles.

MONANGIÆ, (from *μονος*, alone, and *αγγος*, a vessel); the name of the fifteenth class in Boerhaave's Method; consisting of plants with a single seed-vessel, that is not divided internally into more than one cell. It is exemplified in loose-strife, water-leaf, and pimperl.

MONOCOTYLEDONES *Plantæ*, (from *μονος*, alone, and *cotyledon*, a lobe or seed-leaf); plants so termed, whose seeds have only one lobe, and consequently rise with a single seed-leaf. The term is opposed to *dicotyledones*, which includes plants that rise with two seed leaves.

The distinction of the lobes of the seed was first observed by Cæsalpinus, who thence denominated seeds, *univalvia* and

and *bivalvia*. Mr. Ray afterwards employed it as a primary division in the construction of his ingenious method. *Vide* COTYLEDONES.

MONŒCIA, (from *μονος*, alone, and *οἶκος*, a house); the name of the twenty-first class in Linnæus's Sexual Method; consisting of plants which have male and female flowers placed apart, that is, within different covers, on the same root.

The plants then in the class *monœcia* are not hermaphrodite, as those of the greatest number of classes in the Sexual System; nor male and female upon different roots, as in the class *diœcia*; but androgynous; that is, consist of male and female flowers upon different parts of the same plant. *Vide* ANDROGYNA *Planta*.

In arranging the genera of a system, founded, like that of Linnæus, upon the sexes of plants, it is of the utmost consequence to pay the strictest attention to that real or supposed distinction: as by arranging several genera or species of different sexes under one class or order, the very intention of the arrangement, which is professedly to facilitate the knowledge of plants, is totally defeated. Obvious as this observation must appear, it has not always been attended to by Linnæus; who, in classing and new-modelling the genera, has frequently deviated from the principles of his plan, by confounding plants of different sexes under the same class, order, and genus.—Instances of this impropriety have been already given in the article *diœcia*.

The plants of the following list, which, in strict conformity to the rules of arrangement, ought to have been referred to the class *monœcia*, are arranged by Linnæus under classes and genera, containing hermaphrodite flowers:

Callitriche verna,
Plantago uniflora,
Rumex spinosus,
Glycine monoica,
Arum triphyllum,
Mercurialis ambigua.

The orders in this class are derived from the number, union,
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and situation of the stamina, or male organs; circumstances which constitute the primary characters in the hermaphrodite classes of plants. They are eleven in number, and distinguished by the same names with those of the classes just mentioned. Thus,

Cynomorium, triple-headed pond-weed, ceratocarpus, and elaterium, have only one stamen, or male organ.

Anguria and duck-meat have two stamina.

Omphalea, cat's tail, burr-reed, Job's tears, Indian wheat, tripfacum, olyra, carex, tragia, axyris, jack-in-a-box, and sea-side-laurel, have three stamina.

Centella, birch, box, nettle, and mulberry, have four stamina:

Lesser burdock, ambrosia, parthenium, Jesuit's-bark-tree, amaranthus, and solandra, have five stamina.

Zizania and pharus have six stamina.

Guettarda has seven stamina.

Ceratophyllum, water-milfoil, arrow-head, dog's cabbage, garden-burnet, oak, walnut, beach, horn-beam, hazel-nut, plane-tree, and sweet gum, have several stamina.

Pine, arbor-vitæ, cypresses, plukenetia, dalechampia, acalypha, bastard ricinus, cassava, palma-christi, sand-box-tree, manchineel-tree, and sterculia, have their stamina united below into a cylinder.

Serpent cucumber, male balsam-apple, gourd, cucumber, bryony and single-seeded cucumber, have their stamina united above by the anthers into a cylinder.

Bastard orpine has the stamina placed upon the female organ; a circumstance which involves an absurdity when affirmed of any plant of the class in question; and which, if true, should most certainly have determined the author to place the genus in the class *gynandria*, of which the circumstance just mentioned is the striking and classic character.

To obviate this objection, it has been observed by M. Gouan, that both in bastard orpine and clutia, which latter belongs to a similar order in the class *diœcia*, the *pisillum*, or female organ, is entirely wanting in the male flowers: yet, as the stamina are inserted into the place which the *pisillum* would

would occupy, if the flowers were hermaphrodite, he, therefore, concludes there is no impropriety in establishing an order from that circumstance. To illustrate this, he considers the receptacle of the flower as divided into four concentric circles: the calyx, or flower-cup, constitutes the first or outermost circle; the petals occupy the second; the stamina are placed in the third; and the *pistillum*, or female organ, possesses the innermost or middle circle. Hence it follows, continues our author, that even when the stamina are inserted into the inner side of the petals, they still occupy a circle which is concentric to that of the petals, and placed without that of the pointal. The stamina, therefore, in such circumstances, cannot be reckoned out of their place. But if the middle circle of the receptacle, which is essentially destined for the *pistillum*, should, in the absence even of that organ, be occupied by the stamina, these last are then quite out of their place, and may properly be considered as being attached to the *pistillum*, when inserted into the place which that organ, if it existed, would certainly occupy.

I shall only observe upon this ingenious remark of the French author, that by the same way of reasoning, all the plants of the classes *monœcia* and *diœcia*, might be referred to the class *gynandria* in the Sexual Method; as in these classes the female organ is entirely wanting in the male plants, and the stamina occupy the centre of the receptacle.

MONOGRAPHI, (from *μονος*, alone, and *γραφω*, to write); a class of botanical writers so termed by Linnæus, who have bestowed their attention and researches upon a single vegetable. Of this kind is Dillenius's Treatise on Fig-marigold; Kæmpfer on Tea; Boerhaave on Silver-tree; Haller on Garlick, and the Mountain-speedwells; Breynius and Læstau on Ginseng; Bradley on the Aloe; and several dissertations of Linnæus in the *Amœnitates Academicæ*.

MONOGYNIA, (from *μονος*, alone, and *γυνη*, a woman, or wife); the name of the first order or subdivision in the
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first thirteen classes of Linnæus's Sexual Method; consisting of plants, which, besides their agreement in the classic character generally derived from the number of stamina, have only one style or female organ.

MONOPERIANTHÆ, (from *μονος*, alone, *περι*, around, and *ανθος*, a flower); the name of a class in Wachendorffius's Natural Method; consisting of plants with visible flowers, which have only one of the covers; that is, want either the flower-cup or petals. It is exemplified in ladies mantle, wild orach, hellebore, meadow-rue, medeola, rhubarb, American night-shade, asarabacca, and several others.

MONOPETALOIDES *Flos*. *Vide* MULTIFIDUS *Flos*.

MONOPETALUS *Flos*, (from *μονος*, alone, single, and *πεταλον*, a leaf). *Vide* COROLLA.

MONOPETALI, the name of two classes in Rivinus's Method; consisting of plants whose flowers are composed of one petal, which, in its form, is either regular or irregular. The regular flower of one petal is exemplified in borage, bugloss, tobacco, and the bell-shaped flowers; the irregular flowers of one petal, are the lipped and masqued flowers of Tournefort, the *didynamia* of Linnæus and the Sexualists. Day-nettle, balm, mint, fox-glove, calves-snout, and marjoram, furnish examples.

MONOPHYTANTHÆ, (from *μονος*, alone, *φυτον*, a plant, and *ανθος*, a flower); the name of a class in Wachendorffius's Natural Method; consisting of plants which have male and female flowers placed apart upon the same root. It corresponds to the class *monœcia* in the Sexual System. *Vide* MONOECIA.

MORBUS, a disease. The diseases of plants, so far as they regard botany, will fall properly to be considered under the article VARIETAS, whither we refer the reader.

MOTUS, motion; when applied to plants, the term motion is very limited, and expressive not of an absolute change of place, but of direction. The following observations on this curious subject, may, perhaps, prove not unentertaining to the reader.

And first of the direction of roots and trunks. The direction

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tion of the roots and stems of plants is totally opposite; the former either running directly downwards, or extending themselves transversely or horizontally under the surface of the earth: the latter exhibiting motions of a similar nature, but in a contrary direction. The direction of the root is never vertical, except in the upata or fanar of Senegal, the roots of which twisting, rise vertically upwards a foot above the surface of the earth, and are sometimes covered by the flux of the sea.

Familiar as the appearance is, naturalists are not agreed with respect to the causes which determine the roots of plants to tend universally downwards, either in a horizontal or perpendicular direction, and the stems, on the contrary, to mount perpendicularly or horizontally upwards. So constant, however, are these opposite directions, that a plant being taken out of the earth, and replaced in it in such manner that the root is uppermost, and the stem lowermost; the root will quickly curve downwards, the stem upwards, till each has resumed the direction which is proper and natural to itself.

All the causes which concur in promoting the growth of plants, appear likewise to operate in determining their direction. Such are the air, the sun, light, and the moist warm vapours which arise out of the earth. The three first seem to concur most certainly to the direction of the stem; air and moisture to that of the root.

If any number of plants are placed in pots in a room which only admits the light by a single hole, the stems will incline or direct themselves towards that side. In thick forests, the young trees always lean to the side where the light penetrates. The new shoots of an espalier detach themselves from the wall which robs them of the air, the sun, and the light. It is in quest of the same excellent gifts of Nature, that the lateral branches of trees abandoning the direction of the stem, spread and extend themselves in a direction parallel to the soil, even when planted on a declivity.

In like manner it appears, that the roots penetrate more
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or less deeply into the ground, either in a perpendicular or horizontal direction, in proportion to their greater or less tendency to search for moisture. Thus it is a well known fact, that, in the neighbourhood of canals, ditches filled with water, and ground newly tilled, the roots of plants abandon their natural direction, and, as it were, steer their course towards the fine air, rich juices, and grateful humidity which their situation has placed within their reach.—So strongly indeed are the roots of plants attracted by water, that they frequently relinquish the soil, and penetrate into the very heart of ditches and canals.

This force of extension appears to be greater in roots than in stems. The branch surmounts an obstacle, by leaving its natural direction, and overtopping it. The root, on the contrary, without once going out of its way, pierces the hardest soils, penetrates into walls, which it overturns, and even into rocks, which it bursts.

Although the natural motion of the trunk be to ascend, as was suggested above, yet is it forced oftentimes to descend: for the trunk-roots growing out of some plants near the ground, and shrinking into it, serve, like so many ropes, to pluck the trunk annually lower and lower into the ground, along with them. If these trunk-roots break out only about the bottom of the trunk, then it gradually descends into the earth, and is converted into a root (*Vide* BULBUS); but if the trunk is very slender, and the trunk-roots break forth all along it, then it creeps horizontally; the trunk-roots in question tethering it, as it trails along, to the ground, as in strawberry, cinquefoil, and mint.

I close the present subject with this observation, that the direction of the roots and stems of plants seems to be regulated, in a great measure, by the vapours which they contain, but more by those which arise from the soil in which they grow; and, that heat, the sun, or the light, the causes already suggested, appear to contribute to that direction, only in so far as they augment or regulate the current of these nourishing vapours.

Trunks are not, however, the only parts of plants which
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direct their course towards the air and the light of the sun. There are flowers, which, quitting their perpendicular direction, present their surface directly to that luminous body, and follow its situation in its diurnal course. This sort of motion has been called by some writers, *NUTATION*; and the plants which are subject to it, have been termed *heliotropæ*; that is, turning with the sun. Of this kind are bastard-rocket, dyer's weed, sun-flower, turnsole, and the greatest part of the compound flowers with plain tongue-shaped petals, the *semiflosculosi* of Tournefort, the *planipetalæ* of Ray, and the *ligulati* of Linnæus. In these flowers, the disk or surface looks towards the east in the morning, the south at noon, and the west at night.

The spikes or ears of corn, which hang down by their weight, are observed, in like manner, to incline themselves towards the sun, never to the north. The stems of draba, trientalis, and a species of bastard fever-few with egg-shaped and notched leaves, incline or hang downwards during the night.

The observations of La Hire, Hales, and Bonnet, establish, that these motions are occasioned, not by any twisting in the stem, but by the dryness of the fibres, which, by being exposed to the heat of the sun, contract, and thus determine the *nutaton* of the flowers and young stems. It is in this manner that moisture and dryness alternately dilate and contract the plant improperly called the rose of Jericho; an appearance which is likewise observed in the beards of oats, and in those of the capsules of crane's bill.

The direction of the leaves of several plants suffers considerable changes during the night. This is so certain, that if a botanist who is accustomed to the port or habit of plants, were to examine, in a summer-night, the plants which cover any particular meadow, he would find several which he could not recognize by that character. The same changes happen, when the moisture of the day corresponds to that of the night. The change of direction just mentioned is particularly sensible in compound leaves. During the heat of the sun in the day-time, the pinnated or winged leaves
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of several plants, particularly those of the pea-bloom or leguminous tribe, rise vertically upwards, and form a right angle with the common foot-stalk; the lobes or lesser leaves, which stand opposite, being applied closely together by their upper surface. Several simple leaves, particularly those of *figebeckia*, and Indian mallow, (*urena*,) when their upper surface is exposed to an ardent sun, become, in like manner, concave; which demonstrates their analogy with the winged leaves just mentioned. The artificial heat of a red-hot iron has the same effect upon both; but the plants suffer greatly by the experiment. M. Adanson says, he has observed a similar motion in the leaves of several species of wild orach, after sun-set.

In that state of the atmosphere which generally precedes a storm, and is found most favourable for vegetation, I mean in a close, moist and cloudy air, the winged leaves extend themselves along the common foot-stalk. The same appearance is observed in the leaves of the sensitive plant, when it has been kept for several days in a cellar below ground.

After sun-set, and during the fall of the dew, they incline still lower, hang vertically downwards, and are applied closely together, like the leaves of a book, by the lower surface under the stalk, with which they stand at right angles. The odd lobe, if there is one at the extremity of the leaf, folds itself up, till it has reached the first pair of lobes or smaller leaves in its neighbourhood. This motion, which Linnæus calls the SLEEP of plants, and can be produced by an artificial as well as natural dew, has been observed not only in compound leaves, such as those of the pea-bloom plants, but likewise in some simple leaves, particularly those of balsam and bastard fever-few.

The small leaves of false acacia and liquorice hang downwards during the night, but are not united by the under surface, like the greater part of leguminous plants. Those of the sensitive plant, *mimosa pudica*, extend themselves longitudinally along the common foot-stalk, and infold one another mutually. The small lobes of several species of trefoil, lucern, and lotus, are united only by
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their summits, and form a cavity which contains the young flowers, and shelters them from cold and other injuries to which they are liable in the night-time. In some simple leaves, a similar appearance is observed. Thus the upper leaves of garden orach approach during the night, unite perpendicularly, embrace the young shoot, and do not relinquish that posture till the sun has dissipated the humidity of the air.

The action of the sun has a very different effect upon these leaves, as well as those of some mallows, blites, and trefoils, which, like the flowers mentioned above, follow the direction of that body, and present to it their external surface or disk.

That species of motion peculiar to some flowers, which open and shut at certain stated times, is explained on nearly the same principles with those of the winged leaves mentioned above. For particulars on this subject, the reader is referred to the article *VIGILIE Plantarum*, by which term the motion in question is generally distinguished.

The irritability, if I may so term it, of those plants called sensitive, has been fully considered under the article *LO-MENTACEÆ*, which see.

The last kind of motion observed in plants, is elasticity; a slight irritation at the base of the stamina of berberry, melon-thistle, and little sun-flower, (*cistus helianthemum*,) causes a convulsive motion, or trembling in the parts; the stamina contract, approach the pointal, and do not recover their former position. The fleshy fruits of balsam, spiriting cucumber, and wood-forrel, contract with violence when arrived at maturity, and dart the seeds contained within them to a considerable distance. Dry seed-vessels, as the capsules of most of the ranunculus tribe, aconite, and lark-spur, as likewise those of *fraxinella*, and the liliaceous and leguminous plants, burst open, in like manner, with a considerable force.

To conclude, there are plants, which, far from being endued with that elasticity or spring we have been illustrating, have not even the faculty of resuming their former situation,
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when, by any means, they have been made to change it. Of this kind are the flowers of a species of dragon's head of Virginia, which, on whatever side they are turned, discover not the smallest tendency to recover their former position. —

MULTICAPSULARES, (from *multus*, many, and *capsula*, a species of seed-vessel); the name of a class in Morison's, Hermannus's, and Christopher Knaut's Methods; consisting of plants which have more dry capsules or seed vessels than one. Of this kind are pæony, columbine, helibore, aconite, lark-spur, and several others.

MULTIFIDUS Flos, (from *multus*, many, and *findo*, to cleave); a flower so termed by Linnæus, which consists of one petal divided into several segments. It is synonymous to the *laciniatus flos* of Tournefort, and the *monopetaloides* of other authors.

MULTIPLICATUS Flos, a luxuriant flower, whose petals are multiplied so as to exclude a part of the stamina. *Vide LUXURIANS Flos*.

A multiplied luxuriant flower differs from a full one, the highest degree of luxuriance, in that the petals of the latter are so multiplied as to exclude all the stamina: whereas, those of the former are only repeated or multiplied, two, three, or four times, to the exclusion of but a small part of the essential organs.

A double flower properly so called, that is, a flower whose petals are twice repeated, is the first and lowest degree of luxuriance.

A triple flower, whose petals are thrice repeated, is the second degree of luxuriance. Examples of either degree are afforded by some species of campanula and thorn-apple.

Flowers of one petal are frequently multiplied, but rarely found full. *Vide PLENUS Flos*.

Flowers with more than one petal are subject to all degrees of luxuriance, from the lowest to the highest. That they are subject to multiplication, the genus anemone furnishes sufficient proofs.

In some flowers, the multiplication is effected, not by
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the petals, but by the scales or divisions of the flower-cup; such instances, however, are rare. In a species of dianthus or pink, mentioned by Linnæus, the scales of the calyx are multiplied to such a degree as to give the whole flower the appearance of a spike or ear of corn. The luxuriance of several mountain grasses, particularly of *festuca spiculis viviparis*, is of the same kind, being effected by the monstrous growth of the husks of the calyx, which are metamorphosed into leaves. The same appearance obtains in a species of willow called *salix rosea*, in which, both male and female organs being destroyed by insects, the scales of the catkins are lengthened into leaves. In a species of plantain called *plantago rosea*, the floral leaves of the spike or head of flowers undergo a similar enlargement.

In some plants the flower-cup is coloured; a circumstance which not rarely misleads inattentive observers, who are led to consider such an unusual appearance as a repetition of the petals. Some species of primrose furnish examples of the appearance in question.

All multiplied flowers are monstrous, and are accidentally produced from single ones. *Vide VARIETAS.*

MULTISILIQUÆ, (from *multus*, many, and *siliqua*, a species of pod); the name of the twenty-sixth order in Linnæus's Fragments of a Natural Method; consisting of plants which have more seed-vessels than one. From the etymology of the term; one would naturally imagine, that the seed-vessels in question were of that kind, called by Linnæus, *siliqua*, or pod: but the fact is, that not a single plant of this order bears pods; the greater part having many dry capsules; and the remainder being furnished properly with no seed-vessel, but bearing numerous distinct seeds.

On this account, Morison's title, *multicapsulares*, would have been more proper than the present; though even that would have been expressive of part of the plants only.

List of Genera contained in this Order.

Linnæan Genera.	English Names.
α <i>Aconitum</i> , —	— Monks-hood, wolf's bane.
	f f <i>Aquilegia</i> .

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Linnæan Genera.		English Names.
<i>Aquilegia</i> ,	—	Columbine.
<i>Delphinium</i> ,	—	Lark-spur.
<i>Pæonia</i> ,	—	Pæony.
♂ <i>Dictamnus</i> ,	—	Fraxinella, white dittany.
<i>Peganum</i> ,	—	Wild Syrian rue.
<i>Ruta</i> ,	—	Rue.
γ <i>Adonis</i> ,	—	Adonis, or bird's eye.
<i>Caltha</i> ,	—	Marsh-marigold.
<i>Garidella</i> ,	—	Fennel-flower of Crete.
<i>Helleborus</i>	—	Hellebore.
<i>Isopyrum</i> .		
<i>Myosurus</i> ,	—	Mouse-tail.
<i>Nigella</i> ,	—	Fennel-flower, or devil in a bush.
<i>Ranunculus</i> ,	—	Crowfoot.
<i>Trollius</i> ,	—	Globe-ranunculus, or locker gowlans.
♂ <i>Ætæa</i> ,	—	Herb-christopher, or bancberries.
<i>Anemone</i> ,	—	Wind-flower, anemone.
<i>Atragene</i> .		
<i>Clematis</i> ,	—	Virgin's bower.
<i>Thalictrum</i> ,	—	Meadow-rue.

Habit and Structure of the Plants of this Order.

These plants are mostly perennial herbs: the stems of some are erect; others creep upon the ground, and produce roots near the origin of each leaf, as in some species of ranunculus; others climb, and attach themselves to the bodies in their neighbourhood, either by the foot-stalk of their leaves, as virgin's bower, or by tendrils which terminate the foot-stalk, as atragene. The greatest height of those which rise erect, as lark-spur, seldom exceeds eight feet. Those which climb, rarely exceed fifteen or twenty feet.

The ROOTS are generally fleshy. In some species of anemone they are hand-shaped; in others, as likewise in several

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several species of ranunculus, they are finger-shaped; or cylindric. In some species of hellebore and ranunculus, they are divided into spherical knobs. In some plants too of this order, the roots are fibrous.

The STEMS and YOUNG BRANCHES are cylindric.

The LEAVES, which are of different forms, being sometimes simple and entire, sometimes hand-shaped or winged, are generally alternate, except in virgin's bower and atragene, which bear opposite leaves.

The foot-stalk, which is sometimes cylindric, sometimes angular, is membranous, and very large at its origin, surrounding a great part of the stem from which it proceeds. In *isopyrum*, the membrane in question is terminated on each side by two small teeth, in the form of *stipulæ* or scales. In marsh-marigold it forms a sheath or glove, which is entire, shaped like a cylinder, and quite surrounds the stem.

The FLOWERS are hermaphrodite.

They proceed either singly from the wings of the leaves, or termination of the branches, as in pæony, globe ranunculus, marsh-marigold, mouse-tail, fennel-flower, and some species of ranunculus and anemone; or terminate the branches in a spike, panicle or head, as in aconite, lark-spur, columbine, meadow-rue, and fraxinella. The flower of the winter aconite, a species of hellebore, in coming out of the earth, is folded up in a spiral manner upon its foot-stalk.

These flowers are easily rendered double by culture. Ranunculus, anemone, pæony, monk's-hood, lark-spur, columbine, and fennel-flower, are well-known examples.

The CALYX or flower-cup is wanting in marsh-marigold, monk's-hood, lark spur, columbine, fennel-flower, meadow-rue, anemone, globe ranunculus, *isopyrum*, hellebore, and virgin's bower; in the rest it is composed generally of five pieces, which fall with the petals. The calyx of rue, peganum, and pæony, is permanent.

The PETALS are in number from four to fifteen, generally equal, and sometimes, as in anemone, disposed in two or three series: five is the prevailing number.

The NECTARIUM in this order is various. In the greater
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number,

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number, particularly lark spur and columbine, it is shaped like a horn or spur, and forms a tube at the bottom of the flower. In ranunculus it is a small prominence or melliferous pore in the claw of each petal. In aconite, or monk's hood, it is composed of two long singular appearances like styles, that are lodged within the upper petal, which resembles a helmet.

The STAMINA are, in number, from five to three hundred, distinct, and attached, generally in several rows or series, to the receptacle.

The SEED-BUDS are generally numerous. The style is frequently wanting.

The SEED-VESSEL is wanting in ranunculus, meadow-rue, adonis, atragene, virgin's bower, and anemone. In the rest it is composed of several dry capsules, each containing a single cell.

The SEEDS are numerous, and frequently angular. In anemone, virgin's bower, and atragene, they are terminated each by a beard or hairy tail, which some consider as the remains of the style.

Most of these plants are acrid, and many of them poisonous. In general, plants that have a great number of stamina, are noxious in their quality. Those of this order that are cautiously to be avoided on this account, are most species of monk's-hood, columbine, lark-spur, wild syrian-rue, herb-christopher, hellebore, pæony, and virgin's-bower—Being burnt, these plants furnish a fixed alkali; by distillation, there is drawn from them a nitrous and aluminous substance.

Rue and fraxinella have a strong penetrating smell.—With respect to their virtues, they are caustic and purgative; isopyrum is hepatic. Hellebore, according to some moderns, causes convulsions, and stiffens the limbs.

Since the time of Theophrastus, most of the species of monk's-hood have been reckoned a deadly poison both to men and brutes. Dioscorides, however, recommends the external application of common monk's-hood for pains of the eyes. The flowers of a great many species communicate their noxious quality, by being smelled to; and those of the
species

species called napellus, being placed upon the head, occasion a violent megrim. Of the bad qualities of these plants, we sometimes avail ourselves to get rid of vermin. A decoction of the roots destroys bugs; the same part being powdered and administered in bread, or some other palatable vehicle, to rats and mice, corrodes and inflames their intestines, and soon proves mortal; the juice of the plant is used to poison flesh with, for the destruction of wolves, foxes, and other ravenous beasts. The best antidote to the poison of the different monk's-hoods is said to be the root of a species of the same genus, hence termed healthful or wholesome monk's-hood. It is the *aconitum anthora* of Linnæus. The same plant is regarded as efficacious against bites of serpents and other venomous creatures. The roots have a bitter acrid taste; the leaves are only bitter; the former are chiefly used in medicine, and besides the excellent quality just mentioned, are stomachic, and promote perspiration. The peasants who gather the plant on the Alps and Pyrenees, use it with success against the bite of mad dogs, and to cure the colic.

It is remarkable that the monk's-hoods with blue flowers are much more virulent than the yellow or white-flowered kinds. Miller asserts, from whose authority I know not, that the huntsmen of the wolves and other wild beasts on the Alps dip their arrows into the juice of these plants, which renders the wounds made by them deadly.

Columbine is termed in Latin, *aquilegia*, from the resemblance of its flowers to the claws of an eagle. The leaves of common or wild columbine, the species used in medicine, have been prescribed in gargarisms for inflammations of the jaws and throat. The seeds and roots are reckoned successful in facilitating the eruptions of the measles and small pox.

An ointment made of the seeds of flavesacre, a species of lark-spur, which grows naturally in Italy and the Levant, is said to kill all kinds of lice; whence the plant is sometime known by the name of lousewort.

The lark-spurs are so called from the horn or spur which

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terminates the upper petal, and is termed by Linnæus the *nectarium*. *Delphinium*, which is the Latin appellation of this genus of plants, is expressive of the fancied resemblance of the flowers to a dolphin before they are expanded.

Pæony is said to have derived its name from Pæon, the physician, who is reported to have cured Pluto, when wounded by Hercules, with this herb.

Fraxinella is so called from the resemblance of the form of its leaves to those of the fraxinus or ash, from which circumstance it was denominated little ash, as the name imports. In the dispensatories it has been long known by the title of *dictamnus*. The stalks of this plant abound with an essential inflammable oil, especially in great droughts, when, on the approach of a candle or other igneous matter, the substance in question takes fire, and burns like spirit of wine, till it is entirely exhausted. The roots of this plant have had many virtues attributed to them, but are at present only known as an ingredient in several of our compositions. By its bitter quality, dittany is said to kill toads.

Rue, by its aromatic quality, is heating, cordial and sudorific; all the parts are used in medicine, except the roots. Wild Syrian-rue possesses the same virtues in its native soil, which is Egypt, Syria, Italy, and Spain.

The leaves of stinking black-hellebore are very acrid to the taste, and highly purgative. Those of the green-flowered kind, being dried and powdered, are accounted good to kill worms in children; the former species is dangerous. The country-people, however, frequently give the powder of it likewise to their children for worms: but how dangerous a medicine it is, may be understood by the following fact, related by the ingenious Mr. Martyn. Some years ago, when the ground was covered with a deep snow, a flock of sheep, in Ox-meadow, near Fulborn, in Cambridgeshire, finding nothing but this herb above the snow, eat plentifully of it. They soon appeared much out of order, and most of them died: such as were saved having some oil administered to them in time, which made them vomit up the pernicious herb. Some of those who died, being opened, were found to have the stomach greatly inflamed. In
Wesmoreland,

Westmoreland, where this plant grows in great abundance, it has obtained, from its pernicious quality, the name of felon-grafs. Adanson says, that a clyster of an ounce of a decoction of its root is preferable to any other remedy in apoplestick fits.

Moufe-tail is so termed from its seeds, which, after the fall of the flowers, grow in slender spikes, two or three inches long, resembling a moufe's tail.

All the species of crowfoot are remarkably acrid; yet in some parts of France they eat the tuberous roots of a few species without any bad consequences. The fresh roots of *ranunculus acris* are used by the peasants as an excellent cautery for their cattle. *Ranunculus sceleratus* is said to prove mortal to sheep which feed upon it.

The berries of herb-christopher, which are of a shining black, and of the size of pease, are supposed to be of very noxious quality. A single berry is instant death to poultry and other birds. The root of a species of herb-christopher, a native of North-America, where it is denominated black snake-root, to distinguish it from common snake-root, is supposed to be an antidote against poison, and particularly that of the rattle snake.

Wood anemone with blue flowers tinged with purple, which grows naturally at Wimbledon, in Surry, and Loothonoo, in Bedfordshire, has its leaves frequently covered with the eggs of an insect, whereby the plant, before the expansion of its flowers, is frequently mistaken for a fern.

Anemones, or wind-flowers, (so the Greek name imports,) were so called, from a supposition foolishly entertained by the ancients, that the flowers of these plants never open, except in a brisk wind.

The seeds of great wild climber, or traveller's joy, a species of virgin's bower, which grows naturally in the hedges in many parts of England, make a very fine appearance at the latter end of the year, when they cover the hedges with their plumes or white hairs. These, from their resemblance to beards, have occasioned the plant to be generally known, at that season, among the country people, by the name of old man's beard. It is very acrid to the taste, and without

any smell; it is frequently used as a caustic, and for cleansing old ulcers. The root is said to be purgative.

The leaves of all the species of clematis being bruised, and applied to the skin, burn it into carbuncles, as in the plague; and, if applied to the nostrils in a sultry day, immediately after being cropped, will cause the same uneasy sensation as a flame applied to that part would occasion; hence the title of *flammula*, or little flame, by which this genus of plants was formerly distinguished.

MULTISILIQUÆ is likewise the name of a class in Ray and Boerhaave, consisting, as the foregoing term, of plants which have numerous capsules or seed-vessels.

MUSCI, Mosses. One of the seven families or classes into which all vegetables are divided by Linnæus in the *Philosophia Botanica*. The characteristics of these plants, according to the Sexual System, are,

I. Anthers, without filaments.

II. The male flower, constituted by the presence of the *anthers*, placed apart from the female, either on the same or distinct roots.

III. The female flowers deprived of the *pistillum*.

IV. The seeds devoid of both lobes (cotyledones) and proper coverings; so that they exhibit the naked embryo.

This tribe of plants, as well as the mushrooms, ferns, and sea-weed, is still imperfectly known. Dillenius, professor of botany at Oxford, was the first who attempted an arrangement of them. In his *Catalogus Plantarum circa Gissam*, published at Francfort, in 1719; and afterwards in his *Historia Muscorum*, published at Oxford, in 1741, he divides the Mosses into sixteen genera. This arrangement, however, includes the lichens, some of the fungi, and other plants which belong to very different families. The work in question is, notwithstanding, valuable, in having introduced the knowledge of upwards of two hundred plants, which were unknown before Dillenius: it is, besides, of all his works of this kind, the best executed, both for the descriptions and figures, and should serve as a model to
such

such authors as intend to publish in detail the history of any particular family of plants.

Micheli, in a work entitled, *Nova Plantarum Genera*, published at Florence, in folio, in 1729, divides the mosses into two sections, from the figure and situation of their flowers. These sections comprehend together sixteen genera, amongst which are improperly arranged, like those of Dillenius, several of the lichens and other sea-weed.

The discovery of the seeds of the mosses, though made by Dillenius in 1719, is arrogated by Linnæus to himself, who did not begin to write till 1735. *Vide FRUCTUS.*

In Ray's method the mosses form the third class; in Tournefort's they constitute a single genus, by the name of *muscus*, in the first section of the seventeenth class, which comprehends the mosses, mushrooms, and some of the algæ or sea-weed, and is distinguished by the name of *aspermæ*, or plants without seed; the seeds of the mosses not having been detected by Tournefort.

In the Sexual System, these plants constitute the second order of the class *cryptogamia*, which contains all the plants, in which the parts of the flower and fruit are wanting, or not conspicuous. This order is subdivided into eleven genera, from the presence or absence of the calyx, which, in these plants, is a veil or cover like a Monk's cowl, that is placed over the male organs or tops of the stamina, and denominated *calyptra*; from the sexes of the plants, which bear male and female flowers, sometimes on the same, sometimes on distinct roots; and from the manner of growth of the female flowers, which are sometimes produced singly, sometimes in bunches or cones. These distinctions are mostly borrowed from Dillenius, whose excellence in developing this part of the vegetable kingdom, Linnæus very readily acknowledges.

MUSEI, is likewise the name of the fifty-sixth order in Linnæus's *Fragments of a Natural Method*, consisting of the following genera, which are exactly those of the second order in the class *cryptogamia*, and agree in the general characters just mentioned.

Bryum,

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Linnæan Genera.	English Names.
<i>Bryum</i> , —	— Thread-moss.
<i>Buxbaumia</i> .	
<i>Fontinalis</i> , —	— Water-moss.
<i>Hypnum</i> , —	— Feather-moss.
<i>Lycopodium</i> , —	— Club-moss.
<i>Mnium</i> , —	— Marsh-moss.
<i>Phascum</i> , —	— Earth-moss.
<i>Polytrichum</i> , —	— Golden maiden-hair.
<i>Porella</i> , —	— Hair-moss.
<i>Sphagnum</i> , —	— Bog-moss.
<i>Splachnum</i> , —	— Bottle-moss.

Habit and Structure of the Plants of this Order.

These plants resemble the pines, firs, and other evergreens of that class, in the form and disposition of their leaves, and manner of growth of the female flowers, which are generally formed into a cone.

They frequently creep, and extend themselves like a carpet, upon the ground, trees, and stones, being generally collected into bunches or tufts. The smallest, as *buxbaumia*, are only four lines, or the third part of an inch, in height; and the largest species of *lycopodium*, do not exceed five or six inches.

Few of the mosses are annual plants: small as they are, the greater number are perennial and evergreens. Their growth is remarkably slow, as may be judged by the time which the *anthers*, or male organs, take to ripen; this, reckoning from the first appearance of the *anthers* to the dispersion of their powder or male dust for the purpose of impregnation, is generally four or six months.

Although preserved dry several years, these plants have the singular property of resuming their original verdure upon being moistened; perhaps, they likewise resume their vegetative faculty—a circumstance which future experiments must determine.

Mosses delight in a cool moist situation, and north exposure, where they are screened from the sun.

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The **ROOTS** are fibrous, slender, branched and short.

The **STEMS** and branches are cylindric, and weak; they creep upon the ground, and strike root on every side.

The **LEAVES** are very small and undivided, and differ with respect to situation, being either alternate, opposite, or placed by fours round the stalk.

They have no foot-stalk, nor middle rib that is perceptible, being seated immediately upon the stem, half of which they embrace in golden maiden-hair; so that they do not appear to be true leaves, any more than those of the palms and ferns.

These plants, like the pines, are covered with no sort of down or pubescence.

The **FLOWERS** are universally male and female; in *lycopodium*, *sphagnum*, *phascum*, *hypnum*, and water-moss, the male flowers are produced upon the same plant with the female, and stand above them; in golden maiden-hair, the flowers of different sexes are produced on distinct plants; in *mnium* and *bryum* they are produced, sometimes on the same, sometimes on distinct plants.

The male flowers, which consist entirely of the *anthers*, and their covering, proceed either singly or in clusters from the extremity of the branches, or angles of the leaves; and are seated immediately upon the branches, as in *porella*, and water-moss; or supported by a long foot-stalk, as in *bryum* and golden maiden hair.

The female flowers, which generally resemble capsules or cones, are all placed immediately upon the stem or branches without any foot-stalk, and proceed singly, either from the wings of the leaves or summit of the branches. When produced upon the same plant with the male, they are always placed under them.

The female cones of the mosses greatly resemble, as we have said, those of the pines, and other evergreen trees of that class; the scales which form them are true leaves, each containing, in its wing or angle, a single seed. When the seeds are ripe, the cones in question probably open, for their dispersion. When shut, they resemble buds, and have
sometimes

sometimes been ignorantly mistaken for such. The female flowers of the genus *porella* have not yet been discovered.

The FLOWER-CUP in this order, if it can be called such, is that appearance resembling a veil or monk's cowl, which, in the male flowers, covers, or is suspended over, the tops of the stamina, like an extinguisher, and is termed by Linnæus, *calyptra*. From the presence or absence of this cover, which falls before the opening of the *anthers*, are the genera of this tribe of plants chiefly distinguished by Dillenius, and, after him, by Linnæus.

The PETALS in this order are universally wanting.

The male and female parts of generation in this numerous class of plants, have been described above. The flowers were, at the same time, said to be male and female. In the genus *buxbaumia*, so named from Dr. Buxbaum, a German, who first discovered it in the neighbourhood of Astracan, repeated observations seem to establish it beyond a doubt, that the flowers are hermaphrodite. After the fall of the outward covering or veil, formerly mentioned, the *anthers* are found to be covered with another hood, termed by Linnæus, *operculum*, within which, both Mr. Martyn and Dr. Linnæus discovered an *anthera* suspended by its filament; and at the bottom of the capsule, formerly considered as the *anthera*, were found several seeds under the form of a yellow-green impalpable powder, more unctuous than that of the other mosses.

This singularity observed in the genus *buxbaumia* might create a suspicion that the other mosses, which have their *anthers* covered, like it, with an *operculum*, have, likewise, their stamina or male organs contained within the same covers with the female; and that what have hitherto been judged seeds in the cones of the plants regarded as female, are, in fact, only buds or shoots which perform the office of seeds. But the knowledge we have acquired of the nature of the *anthers* of the other mosses, and of the powder or dust which they contain, is sufficient demonstration, that what has been termed the capsule in the genus *buxbaumia*, is really an *anthera*, which in every way resembles externally, although

although somewhat different in its internal structure; that it contains a powder of the same nature with the male dust of other plants; and finally, that it is only a *stamen*, or male flower; the female flower being most probably to be found on another individual.

With respect to the powder contained in the *anthers* of the mosses, Dillenius assures us, that he has frequently sown of it, with a view to ascertain its real nature, but could never discover in it the smallest tendency to vegetate, like seed; on the contrary, the experiments of the same ingenious naturalist, and of the learned Haller, sufficiently evince, that the powder of the female tops or cones of *mnium* being sown, forms productions in every thing similar to the parent plant.

Upon the whole, there is little doubt, that the cones and stars observed in the mosses, are female flowers; and that the capsules and small bodies endowed with a germinating faculty, which are found between the scales of these cones, are true seeds, or at least, shoots and suckers which supply their place.

The mosses in general are almost tasteless, have few juices, and being once dried, do not readily imbibe moisture from the air. Those which grow in water, being thrown into the fire, turn red, and are reduced to ashes without receiving or communicating any flame; on which account some superstitious people, the Siberians in particular, place water-moss in their chimnies, as a preservative against fire.

From the male flowers of some of the mosses, particularly of *lycopodium*, is dispersed a prodigious quantity of yellow, sulphureous, and inflammable dust, which, according to Olearius, sparkles in the fire like salt-petre, and is known, like that of the pines, by the name of vegetable sulphur.

Most of the mosses are purgative. The *selago* of Dillenius operates both by vomiting and purging, and is reckoned as violent and dangerous as hellebore. Golden maiden-hair is a powerful sudorific.

A species of *lycopodium*, a native of India, and distinguished

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guished in the Hortus Malabaricus by the name of tana-pouel, is said to be a mighty incentive to venery, and to be frequently used by the Indians for that purpose.

A decoction of *lycopodium* is employed, with success, by the country people in violent diarrhœas. The male dust is recommended for nephritic pains, and suppressions of urine. The same powder in decoction is used externally for destroying lice.

With a large species of *sphagnum*, the inhabitants of Siberia stuff cushions and beds.

All these plants are of wonderful efficacy in preserving dry such bodies as are susceptible of moisture; and in retaining, for a long time, the humidity of young plants, without exposing them to putrefaction. For this reason, such plants as are to be sent to any considerable distance, are generally wrapped up in moss.

MUSCOSÆ, the name of the twentieth class in Hermanus's Method; consisting of plants without flower-cup or petals. These are the ferns, and mosses just described: for as to the *calyptra* or hood which covers the male organs of the latter class of plants, and is now considered as the calyx, it had either not engaged the attention of botanists in the time of Herman, or, at least, had been considered as a part unconnected with the flower. Some modern botanists even are still of opinion that the mosses want both flower-cup and petals.

MUTILUS *Flos*, a mutilated flower; a flower so called which is occasionally deprived of either all its petals, or of the greater part.

Mutilation in flowers is opposed to luxuriance, and generally ascribed to a defect of heat.

In cold climates, the following plants, which are natives, some of warm, some of temperate countries, are subject to lose their petals, yet bear flowers and seeds.

Tussilago anandria.

Campanula persoliata.

Campanula euphrasice foliis.

Rubeola patula.

Salvia quæ horminum sylvest. lavendulæ flore.

Lamium.

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Lamium folio caulem ambiente minus.

Ruellia capsulis teretibus.

Convulvulus pes tigridis.

Lychnis apetala lapponica.

Silene portensis.

Cistus salicis folio.

Helianthemum flore maculoso.

M. Adanson affirms that the same thing happens at Paris to sea-milk-wort, water-purslane, and *aminannia*.

Some of the campanulas, particularly that with eye-bright leaves, either occasionally lose their petals altogether, or produce them so small as to be scarcely perceptible.

Flowers which always want the petals, and are not, like the mutilated flowers, only occasionally deprived of them, are distinguished by the name of apetalous. *Vide APETALUS Flos.*

N.

NECTARIUM, from *nectar*, the fabled drink of the gods; defined by Linnæus to be a part of the *corolla*, or appendage to the petals, appropriated for containing the honey, a species of vegetable salt under a fluid form, that oozes from the plant, and is the principal food of bees and other insects.

Notwithstanding this definition, which seems to consider the nectarium to be as necessary a part of the *corolla* as the petals, it is certain that all flowers are not provided with this appendage; neither indeed is it essential to fructification.

There is, besides, a manifest impropriety in terming the *nectarium* a part of the *corolla*. Linnæus might, with equal propriety, have termed it a part or appendage of the *stamina*, *calyx*, or *pointal*, as the appearance in question is confined to no particular part of the flower, but is as various in point of situation, as of form. The truth is, the term *nectarium* is exceedingly vague; and, if any determinate meaning can be affixed to it, is expressive of all the singularities which are observed in the different parts of flowers.

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The tube, or lower part of flowers with one petal, Linnæus considers as a true *nectarium*, because it is generally found to contain the sweet liquor formerly mentioned. This liquor Pontedera compares to that called amnios in pregnant animals, which enters the fertile or impregnated seeds: but that this is not at least its sole use, is evident from this circumstance, that the honey or liquor in question is to be found in flowers where there either are no seeds, or those which, from the want of male organs, cannot be impregnated. Thus the male flowers of nettle and willow; the female flowers of sea-side laurel, and black bryony; the male and female flowers of *clutia*, *kiggelaria*, and butcher's broom, all abound with the honey or nectar alluded to.

Dr. Vaillant was of opinion that the *nectarium* was an essential part of the *corolla*; for which reason he distinguished the singular appearances in fennel-flower and columbine, by the name of petals: the coloured leaves, which are now termed the petals, he denominates the flower-cup.

That the *nectarium*, however, is frequently distinct from the petals, is evident, both from the well-known examples just mentioned, as likewise from the flowers of monk's-hood, hellebore, *isopyrum*; fennel-flower of Crete, barrenwort, grass-of-Parnassus, chocolate-nut, *cherleria*, and *sauvagesia*.

These general observations being premised, we proceed to take a nearer and more particular view of the principal diversities, both in form and situation, of this striking appendage to the flower.

I. In many flowers, the *nectarium* is shaped like a spur or horn; and that either in flowers of one petal, as valerian, water-milfoil, (*utricularia*) butter-wort, and calves-snout; or in such as have more than one, as lark-spur, violet, fumatory, balsam, and orchis.

II. In the following plants, the *nectarium* is properly a part of the *corolla*, as lying within the substance of the petals: ranunculus, lily, iris, crown-imperial, water-leaf, mouse-tail, ananas or pine-apple, dog's tooth violet, pipe-ridge bush, *vallisneria*, *hermannia*, *uvularia*, and *svertia*.

III. The *nectarium* is frequently placed in a series or row within

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within the petals, though entirely unconnected with their substance. In this situation it often resembles a cup, as in narcissus. A *nectarium* of this kind is said by Linnæus to crown the *corolla*. The following are examples: daffodil, sea-daffodil, campion, viscous campion, swallow-wort, *stapelia*, *cynanchum*, *nepenthes*, *cherleria*, balsam-tree, African spiræa, witch-hazel, *olax*, and passion-flower.

IV. In Indian cress, buckler mustard, (*Biscutella*) Barbadoes cherry, and *monotropa*, the *nectarium* is situated upon, or makes part of the calyx.

V. The *nectarium* in bastard flower-fence, is seated upon the *anthers* or tops of the *stamina*; whence the name *adenanthera*, or glandular anthera, which has been given to this genus of plants. In the following list it is placed upon the filaments: bean caper, bay, fraxinella, marvel of Peru, bell-flower, lead-wort, *roëlla*, and *commelina*.

VI. In hyacinth, flowering rush, stock July-flower, and rocket, the *nectarium* is placed upon the seed-bud.

VII. In honey-flower, orpine, buck-wheat, *collinsonia*, *lathræa*, navel-wort, mercury, *clutia*, *kiggelaria*, sea-side laurel, and African spiræa, it is attached to the common receptacle.

Lastly, in ginger, nettle, dyer's weed, heart-seed, *costus*, turmeric, *grewia*, bastard orpine, vanelloe, screw-tree, and willow, the *nectarium* is of a very singular construction, and cannot properly fall under any of the foregoing heads.

A more particular description of the varieties which occur in this striking part of the flower, would be unnecessary in this place; as both its form and situation have been minutely attended to in our analysis of the several natural orders or families of plants.

In discriminating the genera, the *nectarium* often furnishes an essential character.

Plants which have the *nectarium* distinct from the petals, that is, not lodged within their substance, are affirmed by Linnæus to be generally poisonous. The following are adduced as examples: monk's-hood, hellebore, columbine, fennel-flower, grass-of-Parnassus, barren-wort, oleander, marvel

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marvel of Peru, bean caper, succulent swallow-wort, fraxinella, and honey-flower.

The term *nectarium*, by which this part of the flower has been distinguished, is the invention of Linnæus, who pretends even to have first recognized the part in question. It is certain, however, that Tournefort, in 1694, observed it in the passion-flower, swallow-wort, and some other plants: and that Vaillant, in 1718, regarded it as a part depending upon the petals, which did not merit any particular appellation.

NOMINA, names.

The distinguishing of plants and collections of plants by particular names was a necessary consequence of their methodical distribution into classes, genera, and species.

The principles laid down on this subject by Linnæus, who has new-modelled the names, as well as genera of former botanists, fall properly to be considered in this place. And, first, of the

Names of Classes and Orders.

I. The ancient botanists distinguished many of their classes by primitive names; that is, names not expressive of any particular character in the plants which compose them. Hence the grasses of Tragus; the ferns, mosses, mushrooms, and thistles of Dodonæus; the palms and orchides of Lobelius; the lettuces, mallows, and cucumbers of Zaluzianski; the night-shades, poppies, and Bryonies of Caspar Bauhin; the campanulas and borages of John Bauhin.

Mr. Adrien Royen is the first, and perhaps the only one of the moderns, who has established for a principle, that the name of every class ought to be derived from the name of some well-known or remarkable genus in it.

Modern systematic writers, studious to abridge the science of botany, by suppressing all superfluous characters, and keeping the most essential only in view, have established, that the name of the class should not be simple or primitive, but expressive of a certain character or characters found in all the plants which compose it. Hence the leguminous, sili-
quose,

quose, berry-bearing, umbelliferous, and lactescent plants of Morison; the cross-shaped, and butterfly shaped flowers of Tournefort; the rough-leaved plants, those which flower at the joints and form a head, of Ray; the *ensatæ*, *campanaceæ*, and other orders in Linnæus's Fragments of a Natural Method; and all the classes of the Sexual System.

The inconveniences arising from a strict compliance with this rule, are two: first, that it is difficult to find a name which shall be expressive of some circumstance that is common to all the genera of any particular class. Thus, many genera of the first class in the Sexual Method, *monandria*, might, with equal propriety, be referred to the second and third classes, *diandria* and *triandria*, the number of *stamina* being either one, two or three. In like manner, the class *icosandria* contains plants which have not the circumstance expressed in the title; the number of *stamina* being generally more, sometimes less than twenty: besides, the essential character of this class, which is the insertion of the *stamina* and petals into the inner part of the calyx, is not even alluded to in the title. In the same manner, the genus *cleome* does not possess the character expressed in the title *tetradynamia*, to which class it belongs. Examples of the like impropriety might be adduced from the classes *monœcia*, *diœcia*, and *polygamia* of the Sexual Method, and from the names of classes in other systems.

The other inconvenience just mentioned arises from employing names expressive of several characteristic marks; as these, in such cases, being too long and complex, assume a barbarous appearance, and become unintelligible. Wachendorffius's classes are particularly faulty in this respect. His *pollaplostemonopetalæ*, *cleutheromacrostemones*, and *distemonopleantheræ*, furnish striking examples.

II. The names of classes and orders should consist of a single word. All Linnæus's classical names are of this sort.

Cæsalpinus has employed definitions instead of names in his arrangement. Tournefort and Rivinus have frequently made unnecessary repetitions at the head of each class, oc-

casioned generally from the circumstance of affixing part of the same name to two different classes. Thus the first class in Rivinus's Method consists of perfect, simple, *regular* flowers with one petal; the eleventh class of the same method is defined to consist of flowers with one petal that are perfect, simple, and *irregular*. In like manner, the definition of Tournefort's first class is expressive of the simplicity and *regularity* of the flowers contained in it, which consist of a single petal, that is bell-shaped; the fourth, of the simplicity and *irregularity* of the flowers contained in it, which consist of a single petal, that is lip-shaped.

III. Names of classes and orders, taken from the name of any plant or genus of plants, are only to be used, according to Linnæus, in natural methods. Of this kind are the palms, ferns, mosses, sea-weed, mushrooms, grasses, *orchideæ*, *corydales*, *cucurbitaceæ*, *calamariæ*, *rhœades*, *caryophyllæi*, and *piperitæ* of Linnæus's Fragments; the *palmae*, *lilia*, *gramina*, of Royen's Natural Method. Such names are certainly convenient, as they serve to recall the idea of the general relations of each family or order; relations, which are, in a manner, collected in the plant from which the classical name is derived. The classic and generic name, however, is at no time to be precisely the same; as, besides the manifest impropriety of arranging a thing under itself, the greatest confusion would ensue from such arrangement. For this reason, Linnæus, when he uses classical names of this kind, generally changes the name of the genus which suggested the classical name in question. Thus in the natural order *palmae*, no genus of that name is to be found. In like manner, the genus *felix*, one of the ferns, is changed for *pteris*, because he has distinguished that order of plants by the general or classical name of *filices*. It is upon the same principle that the ingenious Royen has substituted the Greek name *lirium*, instead of *lilium*, the more common name of that genus, because *lilia* is the name by which he has distinguished the class.

IV. Names of classes and orders are not to be derived from the habit, virtues, and sensible qualities of plants, nor
from

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From the form, situation, and other circumstances of the roots and leaves ; as such appellations are not in the spirit of systematic arrangement. To this censure is subjected the *cordiales*, *dorsiferae*, and *furculentæ* of some botanists ; the *capillares* of Morison and Ray ; the *bulbosæ* of Cæsalpinus ; the *asperifoliæ* of Ray ; the *verticillatæ* and *stellatæ* of the same author.

Names of the Genera.

I. A genus of plants being a collection of species which agree in the parts of fructification, it is evident that all the species of the same genus must be marked or distinguished by the same generical name. Thus the orange, lemon, and citron, being considered by Linnæus as forming one genus, are distinguished by the generical name *citrus*, in this manner, *citrus aurantium*, the orange, *citrus medica*, the citron-trec, *citrus medica limon*, the lemon ; this last being esteemed a variety of the citron, in like manner as the shaddock, termed *citrus aurantium decumana*, is of the orange. These fruits were reckoned three distinct genera by Tournefort.

II. The generical name is not only to be the same, but single in all the plants of the same genus. Hence there is an impropriety in distinguishing blue monk's-hood or aconite, as did Bauhin, by the additional name of *napellus* ; and the wholesome species of the same genus, by that of *anthora*.

III. The same generic name is not to be applied to two different genera. Hence the *aconitum* of Ray is changed for *helieberus* ; the *caltha* of Tournefort into *calendula* ; the *cameraria* of Dillenius into *montia* ; the *sherardia* of Vaillant into *verbena* : the names so changed having been used to denominate other genera, with which those in question have no connection.

IV. Whoever constitutes a new genus, says Linnæus, is bound likewise to give it a name.

V. The generic name of a plant is to be fixed, before any attention be given to its name as a species.

VI. Generic names consisting of two entire distinct words, Linnæus is of opinion should be totally exploded. For this reason he has changed the *bellia donna*, *centaurium majus*,

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corona solis, *dens leonis*, and *vinis idæa* of Tournefort, for *atropa*, *centaurea*, *helianthus*, *leontodon*, and *vaccinium*; the *crista galli* of Dillenius, for *rhinanthus*.

VII. Generic names compounded of two entire Latin words joined together, are deemed rather inelegant, and may be properly enough changed for a Greek compound of the same kind. Thus the *comaurca* of former botanists, is changed by Linnæus for *chrysocoma*, the etymology of which is the same.—The names of the following genera, although of Latin composition, are retained by Linnæus; *rosmarinus*, *cornucopiæ*, *sempervivum*, and *sanguisorba*.

VIII. Generic names compounded of two words of different languages, are highly improper. Of this kind are the *tamarindus* and *cardamindum* of Tournefort; the *morinda*, *chrysanthemindum*, and *sapindus* of Vaillant.

IX. The termination *oides*, very common with former botanical writers, has been justly exploded by Linnæus as inelegant and superfluous. Thus the *agrimonoides* of Tournefort, is changed for *agrimonia*; *alyssoides* for *alyssum*; *asteroides* for *buphtbalmum*; *cyperoides* for *carex*; *nymphoides* for *menyanthes*; *pentaphylloides* for *potentilla*; *rhamnoides* for *hippophæe*; *ricinoides* for *croton*; *telephioides* for *andrachne*; *tribuloides* for *trapa*; *chrysanthemoides* for *osteospermum*; *cuminoides* for *lagæcia*; *astragaloides* for *phaca*; the *capnoides* of Ray, for *fumaria*; the *valerianelloides* of Bauhin, for *valeriana*. The *alsinastroides* and *jonthlaspioides* of Kramer, furnish likewise striking examples of the impropriety in question.

X. Names of genera compounded of two generic words, one of which is entire, are not to be imitated. For this reason Linnæus has changed the *cannacorus* of Tournefort, for *canna*; *lilionarcissus* for *scilla*; *linagrostis* for *eriphorum*; *laurocerasus* for *padus*; the *capnorchis* of Bauhin, for *fumaria*. Greek compounds of this kind may be safely admitted; *elæagnus*, *quasi oleæ agnus castus*, and *cissampelos*, *quasi hederæ vitis*, furnish examples.

XI. Diminutives from other genera, or generic names formed from others with the addition of one or two syllables at the end, are improper, as seeming to indicate a connection, which,

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which, perhaps, does not exist. For this reason Linnæus has changed the

Old Genera.

Linnean Genera.

Acetosella — —	} of Ray, for	Rumex.
Napellus — —		Aconitum.
Myrtillus — —		Vaccinium.
Lappula — —		Myosotis.
Fabbaria — —		Sedum.
Rosea — —		Rhodiola.
Alsinanthes — —		Trientalis.
Morocarpus — —		Blitum.
Lupinaster — —	} of Bauhin, for	Trifolium.
Saliunca — —		Valeriana.
Alfinastrum — —	} of Tournefort, for	Elatine.
Rapistrum — —		Myagrum.
Limonium — —		Statice.
Lapathum — —		Rumex.
Erucago — —		Bunias.
Corallodendron — —		Erythrina.
Fagopyrum — —		Helxine.
Adonia — —	} of Plumier, for	Myosurus.
Sediformis — —		Stratiotes.
Linophyllum — —		Thesum.
Alfinastriformis — —		Montia.
Fungoidaster — —	} of Micheli, for	Elvela.
Lenticularia — —		Lemna.

Balsamita — — of Vaillant, for *Tanacetum*.

XII. Generic names of plants borrowed from the animal and mineral kingdoms, the heavenly bodies, and moral qualities, are condemned by Linnæus, as introducing confusion

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sion and obscurity into the nomenclature of the science. On account of this impropriety, he has changed the

Old Genera.		of	Linnean Genera.
<i>Elephas</i> — — —	} Tournefort, for	{	<i>Rhinanthus</i> .
<i>Onagra</i> — — —			<i>Oenothera</i> .
<i>Buglossum</i> — — —			<i>Anchusa</i> .
<i>Ephemerum</i> — — —			<i>Tradescantia</i> .
<i>Stæchas</i> — — —			<i>Lavandula</i> .
<i>Scolopendrum</i> — — —			<i>Asplenium</i> .
<i>Sphondylium</i> — — —			<i>Heracleum</i> .

Erinaceus — — of Dillenius, for *Hydnum*.

<i>Locusta</i> — — —	} of Ray, for	Valeriana.
<i>Sol</i> — — —		Helianthus.
<i>Staphylinus</i> — — —		Daucus.

<i>Ampelis</i> — — —	} of other Botanists, for	<i>Vitis.</i>
<i>Lagopus</i> — — —		<i>Trifolium.</i>
<i>Meleagris</i> — — —		<i>Fritillaria.</i>
<i>Natrix</i> — — —		<i>Ononis.</i>
<i>Hippoglossum</i> — — —		<i>Ruscus.</i>
<i>Phalangium</i> — — —		<i>Anthericum.</i>
<i>Granatum</i> — — —		<i>Punica.</i>
<i>Molybdæna</i> — — —		<i>Plumbago.</i>
<i>Balanus</i> — — —		<i>Nepenthes.</i>
<i>Patientia</i> — — —		<i>Rumex.</i>
<i>Concordia</i> — — —		<i>Agrimonia.</i>

XIII. For the same reason, the nomenclature of botany should not be confounded with that of anatomy, pathology, the materia medica, and the arts. Hence Linnæus has changed the

Old Genera.			Linnean Genera.
<i>Ptarmica</i>	—	} of Tournefort, for	<i>Achillea</i> .
<i>Cardiaca</i>	—		<i>Leonurus</i> .
<i>Vesicaria</i>	—		<i>Alyssum</i> .
<i>Vulnaria</i>	—		<i>Anthyllis</i> .
			<i>Auxicula</i> .

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Old Genera.

Linnean Genera.

<i>Auricula</i>	—	—	} of other Botanists, for	{	Primula.
<i>Epiglottis</i>	—	—			Astragalus.
<i>Priapus</i>	—	—			Nepenthes.
<i>Umbilicus</i>	—	—			Cotyledon.
<i>Paralyfis</i>	—	—			Primula.
<i>Soda</i>	—	—			Salsola.
<i>Sphaccllus</i>	—	—			Salvia.
<i>Verruca</i>	—	—			Lapfana.
<i>Candela</i>	—	—			Rhizophora.
<i>Sagitta</i>	—	—			Sagittaria.
<i>Serra</i>	—	—			Bifferrula.
<i>Clitoris</i>	—	—			Clitoria.
<i>Mufcipula</i>	—	—			Silene.
<i>Corona</i>	—	—			Helianthus.
<i>Burfa</i>	—	—			Thlafpi.
<i>Solea equina</i>	—	—			Hippocrepis.

XIV. Names pertaining to claffes and natural orders, are by no means to be applied to any particular genus. Hence *Fungus*, *Alga*, *Mufcus*, *Filix*, *Palma*, are very improper generic names : as are *Planta*, *Arbor*, *Frutex*, *Suffrutex*, *Herba*, and fuch like terms, from their very general nature and fignification.

XV. Latin diminutives, and other names of like origin expreffive of fome property in the parts of the plants fo characterized, furnifh proper, though not elegant, generic names. Of this kind are,

Potentilla, Lin. (*potentia*, power) from its powerful virtues.

Pulfatilla, Tourn. (*pulfare*, to beat often) from its flowers being toffed and fhaken by the wind.

Limofella, Lin. (*limus*, flime) from its native foil.

Nigella, Tourn. (*niger*, black) from the blacknefs of its feeds.

Clypeola,

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Clypeola, Lin. (*clypeus*, a shield) from its seed-vessel resembling a shield.

Mitreola, Lin. (*mitra*, a mitre) from its mitre-shaped fruit.

Gladiolus, Tourn. (*gladius*, a sword) from its sword-shaped leaves.

Samolus, Tourn. (Samos, an island) from its place of growth.

Calendula, Ruppis, (*calendæ*, the first of every month) from its flowering at all seasons, and during every month in the year.

Campanula, Tourn. (*campana*, a bell) from its bell-shaped flower.

Crassula, Dillen. (*crassus*, thick) from the thickness of its leaves.

Primula, Lin. (*primus*, first) from its early flowering.

Pinguicula, Tourn. (*pinguis*, fat) from the fatness of its leaves.

Hirtella, Lin. (*hirtus*, hairy) from the hairiness of its branches.

Crucianella, Lin. (*crux*, a cross) from its leaves being placed cross-wise.

Sanicula, Tourn. (*sano*, to cure) from its vulnerary quality.

Serratula, Dillen. (*serra*, a saw) from its sawed leaves.

Spergula, Dillen. (*spargo*, to scatter) from the dispersing or scattering of its seeds.

Convolvulus, Tourn. (*convolvere*, to twist together) from the convolutions or twistings of its stalks.

Asperugo, } Tourn. { (*asper*, rough) from the roughness of
Asperula, } Lin. { the plants which compose the genus.

Mollugo, Lin. (*mollis*, soft) from its softness.

Plumbago, Tourn. (*plumbum*, lead) from its lead-colour.

Solidago, Vaill. (*solidus*, solid) from its consolidating quality.

Urtica, Tourn. (*uro*, to burn) from its stinging or burning upon being touched.

Lactuca, Tourn. and Vaill. (*lac*, milk) from its leaves, stalks, and flowers abounding in a white milky juice.

Tussilago,

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- Tussilago*, Tourn. and Vaill. (*tussis*, the cough) from its great efficacy in coughs and catarrhs.
- Spinacia*, Tourn. (*spina*, a thorn) from its prickly fruit.
- Salsola*, Plum. (*sal*, salt) from the brackish taste of the plant.
- Sedum*, Tourn. (*sedeo*, to sit) from its station on walls and rocks.
- Cornus*, Tourn. (*cornu*, a horn) from the shell of the fruit, which is as hard as a piece of horn.
- Juglans*, Lin. (*quasi* Jovis glans) from its being consecrated to Jupiter.
- Ranunculus*, Tourn. (*rana*, a frog) from its growing in moist places, which are frequented by frogs.
- Lavandula*, Tourn. (*lavo*, to wash) from its being used in baths and washes, on account of the fragrancy of its smell.
- Juncus*, Tourn. (*jungo*, to join) from the stalks being joined together, and wrought into baskets and other useful utensils, when dried.
- Ledum*, Rupp. (*lædo*, to hurt) from its offensive smell.
- Salix*, Tourn. (*salio*, to leap) from its quick growth.
- Reseda*, Tourn. (*resedare*, to appease) from its allaying pain.
- Borago*, Tourn. (*quasi cor ago*, to take heart) from its exhilarating quality.
- Ferula*, Tourn. (*ferio*, to strike) from rods being formerly made of its stalks, with which school-masters corrected their scholars.
- Biserrula*, Lin. (*bis*, twice, and *ferra*, a saw) from its pods being sawed or indented on both edges.
- Biscutella*, Lin. (*bis*, twice, and *scutum*) from the fruit resembling a double buckler.
- Tropæolum*, Lin. (*tropæum*, a trophy) from its fancied resemblance to the insignia of a trophy.
- Phascolus*, Tourn. (*phaselus*, an oblong swift ship) from the husk or covering of the seeds resembling the hulk of a galley.
- Pyrola*, Tourn. (*pyrus*, a pear) from its pear-shaped leaves.
- Proserpinaca*,

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- Proserpinaca*, Lin. (*serpo*, to creep) from its stalks creeping on the ground.
- Medicago*, Tourn. (*Media*, the name of a country) from its having been brought into Greece, from Media, by Darius Hytaspes, as Pliny relates.
- Coronilla*, Tourn. (*corona*, a crown) from its flowers being collected in bunches at the termination of the stalks.
- Arenaria*, Lin. (*arena*, sand) from its native soil.
- Convallaria*, Lin. (*convallis*, a valley) from its common place of growth.
- Clavaria*, Vaill. (*clavus*, a club) from its habit and appearance.
- Capraria*, Lin. (*capra*, a she-goat) from its being browsed on by goats.
- Cochlearia*, Tourn. (*cochleare*, a spoon) from its leaves being hollowed like a spoon.
- Coriaria*, Nissol. (*corium*, leather) from its use in tanning.
- Cymbaria*, Ammannus, (*cymba*, a boat or skiff) from the figure of its fruit.
- Dentaria*, Tourn. (*dens*, a tooth) from its roots being composed of a great number of scales resembling teeth.
- Fragaria*, Tourn. (*fragrans*, fragrant) from its fragrant aromatic smell.
- Globularia*, Tourn. (*globus*, a globe or sphere) from the figure of the flower.
- Herniaria*, Tourn. (*hernia*, a rupture) from its efficacy in ruptures.
- Lunaria*, Tourn. (*luna*, the moon) from the figure of its fruit or seed-vessels.
- Matricaria*, Tourn. and Vaillant, (*matrix*, the womb) from its efficacy in diseases of the uterus.
- Pulmonaria*, Tourn. (*Pulmones*, the lungs) from its efficacy in disorders of the breast and lungs.
- Parietaria*, Tourn. (*paries*, a wall) from its growing on old walls.
- Mirabilis*, Ray, (*Lat.* admirable) from the beautiful diversity of colours in its flowers.
- Sempervivum*, Rupp. (*semper*, always, and *vivo*, to live) from its continual verdure.

Perficaria,

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- Persicaria*, Tourn. (*persica*, a peach-tree) from the resemblance of its leaves to those of the peach-tree.
- Sagittaria*, Lin. (*sagitta*, an arrow) from its arrow-shaped leaves.
- Sanguinaria*, Dillenius, (*sanguis*, blood) from its juice, which is of a yellow colour, inclining to red.
- Sapnaria*, Lin. (*sapo*, soap) from the deterfive quality of the leaves.
- Scoparia*, Lin. (*scopa*, a besom) from the use to which the plant is generally applied.
- Momordica*, Tourn. (*mordeo*, to bite) from the appearance of the seeds, which are flat and compressed, as if they had been grinded or chewed.
- Scrophularia*, Tourn. (*scrophula*, king's evil) from its supposed efficacy in scrophulous complaints.
- Trifolium*, Tourn. (*tres*, three; and *folium*, a leaf) from its bearing finger-shaped leaves, each leaf consisting of three smaller leaves furnished with short partial foot-stalks.
- Passiflora*, Lin. (*patior*, to suffer, and *flos*, a flower) from the fancied resemblance of the organs of generation to a hammer and nails, the instruments of suffering.
- Stellaria*, Lin. (*stella*, a star) from the figure of its flower.
- Subularia*, Ray, (*subula*, an awl) from its awl-shaped leaves.
- Utricularia*, Lin. (*utriculus*, a little bladder) from the round two-horned vessels distended with air, which it bears on its roots.
- Gloriosa*, Lin. (*gloria*, glory, excellence) from the beautiful and superb appearance of its flowers.
- Angelica*, Lin. (*lat.* angelic) from the approved virtues of its root and seeds.
- Fontinalis*, Dillen. (*fons*, a fountain) from its place of growth.
- Sanguisorba*, Ray, (*sanguis*, blood, and *sorbeo*, to drink up) from its great efficacy against spitting of blood.
- Turritis*, Tourn. (*turris*, a tower) from its height.
- Impatiens*, Ray (in, not, and *patior*, to suffer) from the elasticity of its fruit, which may therefore be said not to bear the touch.

Imperatoria.

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- Imperatoria*, Tourn. (*imperator*, a commander) from the great efficacy of its root in medicine.
- Hepatica*, Rupp. and Dillen. (*hepar*, the liver) from the figure of its leaves.
- Pedicularis*, Tourn. (*pediculus*, a louse) from its supposed efficacy in destroying lice.
- Saxifraga*, Tourn. (*saxum*, a rock, and *frango*, to break) from its growing on the clefts of rocks.
- Parnassia*, Tourn. (*Parnassus*, a mountain in Phocis) from its place of growth.
- Iberis*, Rupp. and Dillen. from the kingdom of Iberia or Spain.
- Smyrnium*, Tourn. from the city of Smyrna.
- Nepeta*, Lin. from a town in Italy of that name.
- Arabis*, Lin. from the kingdom of Arabia.
- Moluccella*, Lin. from the Molucca islands.
- Arethusa*, Gronovius, from the celebrated fountain of that name, near Syracuse in Sicily.
- Punica*, Tourn. (*Poeni*, the Carthaginians) from the city Carthage.
- Thapsia*, Tourn. from *Thapsus*, a town of *Africa propria*, near which Scipio and Juba were defeated by Cæsar.
- Colchicum*, Tourn. from Colchis, a country of antient Asia, to the East of the Euxine Sea, celebrated for the expedition of Jason and the Argonauts.
- Patagonula*, Lin. from Patagonia, a country in South America.
- Carica*, Lin. from Caria, a country in lesser Asia.
- Ligusticum*, Tourn. from Liguria, a province of Italy.
- Marrubium*, Tourn. from a town in Italy, now San Benedetto.
- Toluifera*, Lin. from its producing the substance known by the name of Balsam of Tolu.
- Indigofera*, Lin. from its producing the colour known by the name of Indigo.
- Digitalis*, Tourn. (*digitus*, a finger) from its flower, resembling the finger of a glove.

Scabiosa,

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Scabiosa, Tourn. (*scabies*, scab, itch) from its efficacy in disorders of the skin.

Amthyslea, Lin. from its flowers resembling an amethyst in colour.

Gratiola, Lin. (*gratia*, favour, efficacy) from its use in medicine.

Ziziphora, Lin. from the Indian name Zizi.

Jambolifera, Lin. from the Indian name Jambolo.

Uvaria, Lin. (*Uva*, a grape) from the figure of its fruit.

Uvularia, Lin. from the fancied resemblance of its fruit to the uvula of the throat.

Craniolaria, Lin. (*cranium*, the skull) from the nut which, in figure, resembles the skull of some wild beasts.

Piscidia, Lin. (*piscis*, a fish) from the rare quality possessed by its bark, of intoxicating fish. See *Papilionaceæ*.

XVI. Names borrowed from the fables of the poets, or intended to perpetuate the memory of some celebrated men, and particularly of the patrons of botanical knowledge, are admitted into the modern nomenclature, which, however, excludes the numerous list of generical names in commemoration of saints and illustrious men in other sciences.

The poetical names of genera are as follows; *Ambrosia*, *Nepenthes*, *Cornucopiæ*, *Crocus*, *Protea*, *Centaurea*; *Ætæa*, *Chironia*, *Achillea*, *Narcissus*, *Hyacinthus*, *Amaryllis*, *Phyllis*, *Pœonia*, *Cerbera*, *Adonis*, *Circæa*, *Medeola*, *Andromeda*, *Daphne*, *Syringa*, *Canna*, *Myrsine*, *Mentha*, *Smilax*. A very slight acquaintance with the poets, particularly with Ovid's *Metamorphoses*, will render any comment upon these names altogether unnecessary.

The following genera are denominated from gods, kings, and patrons of the science.

Asclepias, Tourn. from *Æsculapius*, the god of physic.

Mercurialis, Tourn. from Mercury, the interpreter and messenger of the gods.

Hymenæa, Lin. from Hymen, the god of marriage.

Serapias, Lin. from Serapis, the idol worshipped by the Egyptians; or, perhaps, from Serapion, the celebrated Arabian physician.

Satyrion,

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Satyrum, } Lin. } from the Satyrs, a sort of wood-laird
Satureia, } Tour. } deities, supposed to preside over the
 libidinous actions of men; the name is very properly ap-
 plied to the first genus, on account of its supposed aphro-
 disiac or stimulating quality:

Ixora, Lin. the idol worshipped by the natives of Malabar.

Tagetes, Tourn. and Vaill. from Tages, a grandson of Ju-
 piter, and instructor of the ancient Tuscans in augury
 and the occult sciences.

Nymphæa, Tourn. from the nymphs in general, but particu-
 larly those who presided over waters.

Naias, Lin. from the naiads, a class of nymphs who pre-
 sided over rivers and fountains.

Dryas, Lin. from the dryads, another class of nymphs,
 who presided over woods and trees, particularly the oak,
 (*oëus, quercus*).

Artemisia, Tourn. and Vaill. the celebrated wife of Mau-
 solus, king of Caria.

Helenia, Lin. from Helen, the wife of Menelaus.

Atropa, Lin. from Atropos, one of the PARCÆ, or fatal
 sisters, to whom was committed the charge of cutting the
 thread of life.

Lysimachia, Tourn. from Lysimachus, a king of Sicily.

Philadelphus, Lin. from Ptolemy Philadelphus, a king of
 Egypt.

Teucrium, Tourn. from Teucer, founder of the kingdom
 afterwards called Troy.

Valeriana, Tourn. from the celebrated Valerian family at
 Rome.

Gentiana, Tourn. from Gentius, a king of Illyria.

Pharnaceum, Lin. from Pharnaces, a king of Pontus.

Telephium, Tourn. from Telephus, a king of Mysia.

Borbonia, Lin. from the celebrated house or family of Bour-
 bon.

Eugenia, Michel. from the illustrious Prince Eugene of
 Savoy.

Piercea, Miller, from his grace Hugh Percy, first duke of
 Northumberland.

Petrea, Houston, from Lord Petre.

Cliffortia,

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Cliffortiâ, Lin. from George Clifford, J. U. D. of Amster-
dam, a great improver and patron of botany.

Stewartiâ, Lin. from the late excellent naturalist, and most
munificent patron of learning, John Stuart, first earl of
Bute.

Bosca, Lin. from a senator of Leipstick of that name.

Nicotiana, Tourn. from James Nicot, a Frenchman, who
first imported the seeds of tobacco (the genus in question)
into France.

XVII. Generic names in honour of celebrated botanists
form a very considerable part of the modern nomenclature.
The following list is entirely of this kind.

Theophrasta, Lin. from Theophrastus, the father of botany.

Crateva, Lin. from Cratevas, an ancient botanist, mentioned
by Pliny in his Natural History.

Hippocratea, Lin. and Jacquin, from Hippocrâtes, the father
of physic.

Musa, Plumier, from Antonius Musa, physician to Augustus
Cæsar, and supposed to be commemorated by Virgil under
the name of *Japis*, in the 12th book of the *Æneid*.

Dioscorea, Plumier, from Dioscorides, the celebrated Greek
botanist.

Plinia, Plumier, from Pliny the elder, the celebrated na-
turalist.

Brunfelsia, Plumier, from Tho. Brünfels, Brunfelsius, a
German divine, physician and botanist, who flourished in
the sixteenth century.

Ruellia, Plumier, from Johannes Ruellius, a French-man,
likewise of the 16th century, author of a Commentary
on Dioscorides, and of a work in three books, on the
Nature and History of Plants.

Crescentia, Lin. from Petrus de Crescentia, a senator of
Bologna, who lived in the 13th century, and is author of
a book entitled *Opus Ruralium Commodorum*.

Dorstenia, Plum. and Houst. from Theodoric Dorsten, a
German botanist, author of a book entitled *Botanicon*, pub-
lished at Francfort in 1540.

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- Gesneria*, Plum. from the celebrated Conrad Gesner, author of several botanical works.
- Fuchsia*, Plumier, from Leonard Fuchs, a German of the 16th century, author of a History of Plants.
- Matthiola*, Plum. from P. A. Matthiolus, an Italian botanist, whose principal work is an excellent edition of Dioscorides, with ample illustrations.
- Lonicera*, Ray, from Adam Lonicer of Francfort, author of a History of Plants published in 1551.
- Turnera*, Plum. from Dr. William Turner, of Morpeth, author of an English Herbal, printed at London, in 1551.
- Tragia*, Plum. from Hieronymus Bock, commonly called Tragus, a physician and divine of Deux Ponts, author of a History of Plants first published at Strasburgh in 1539.
- Dodonæa*, Lin. from Dodoens, or Dodonæus, a German, author of a botanical work, published at Antwerp, in 1552.
- Bellonia*, Plumier, from Peter Belon, a French-man of the 16th century, author of a Voyage to the Levant, and of a Treatise on Cone-bearing trees.
- Guilandina*, Lin. from Melchior Guilandin, or Wieland, a Prussian, author of a treatise on the *Synonyma* of plants, and of a Dissertation on the plant from which the ancients made paper, first published in 1572.
- Cordia*, Plum. from Valerius Cordus, a German, author of a History of Plants.
- Monarda*, Lin. from Nicolas Monardes, a Spanish physician, and author of a History of such of the West India plants as are used in medicine, as likewise of a Treatise on Roses and Citrons, Oranges, &c.
- Lobelia*, Plumier, from M. de L'Obel, author of a History of Plants, in 1576.
- Penæa*, Plum. from Peter Pena of Narbonne, contemporary with L'Obel and L'Ecluse, in conjunction with the former of whom he published *Nova Stirpium Adversaria*, at Antwerp in 1576.

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- Clusia*, Plumier, from L'Ecluse, a Frenchman, author of a History of Rare and Exotic Plants.
- Clusia*, Boerhaave, from Augerius Cloot, an ingenious botanist of the 17th century, who, to enrich the botanical garden at Montpellier with the plants of Africa, then little known, attempted a scientific excursion through the Barbary States, but was unfortunately stripped both of his new acquisitions and of his liberty.
- Rauwolfia*, Plumier, from Leonard Rauwolf, a German, author of an Itinerary, or Travels to the Holy Land, and other parts of the East, for the promotion of natural knowledge.
- Cæsalpinia*, Plum. from Cæsalpinus, an Italian, father of systematic botany.
- Duranta*, Plum. from Castor Durante, an Italian, author of a Herbal in the sixteenth century.
- Cameraria*, Plum. from Joachim Camerarius, junior, a German physician and botanist, author of *Hortus Medicus et Philosophicus*, and some other works.
- Dalechampia*, Plum. from Dalechamp, a physician of Lyons, in the sixteenth century, author of a General History of Plants.
- Tabernæmontana*, Plum. from one Theodore, a German, generally known by the name of Tabernæmontanus, from the village where he was born.—He lived in the sixteenth century, and published a History of Plants, in folio, at Francfort.
- Thalia*, Plumier, from Johannes Thalius, a German botanist, author of a Flora, entitled *Sylva Hercynia*.
- Alpinia*, Plum. from Prosper Alpinus, an Italian, author of several botanical works, particularly a Description of the Plants of Egypt.
- Columnier*, Plum. from Fabius Colonna, a noble Italian, who published some curious works in botany.
- Bauhinia*, Plumier, from the two illustrious brothers, Caspar or Gaspard, and John Bauhin, natives of Switzerland, and authors of some well-known botanical works.
- Gerardia*, Plum. from John Gerard, an English apothecary, of Nantwich, in Cheshire, who lived in the six-

- teenth century, and published the Herbal, or General History of Plants, which is well known.
- Robinia*, Lin. from Robin, a Frenchman, who first introduced the plant (False Acacia) into France from Canada.
- Renealmia*, Plum. from Paul Reneaume, a Frenchman, author of a Specimen of a History of Plants.
- Swertia*, Lin. from Emmanuel Sweert, a Dutchman, who lived in the beginning of the seventeenth century, and published a botanical work, entitled *Florilegium*.
- Besleria*, Plum. from Basilius Besler, a German apothecary, author of two large botanical works.
- Marcgravia*, } Plum. { from two ingenious botanists, Marc-
Pisonia, } } grave and Pison, the first a Ger-
man, the other a Dutchman, authors of a Natural History of Brasil.
- Hernandia*, Plum. from Francis Hernandez, a Spanish botanist, of the seventeenth century, author of a Natural History of Mexico.
- Brossæa*, Plumier, from Guy de la Brosse, a Frenchman, author of a book on the nature of plants.
- Parkinsonia*, Plum. from Mr. John Parkinson, author of a History of Plants, under the title of *Paradisus Terrestris*, and of a Treatise entitled *Theatrum Botanicum*.
- Ambrosinia*, Bassius, from Bartholomew Ambrosini, an Italian botanist of the 17th century, author of a History of Capficums.
- Cornutia*, Plum. from Cornutus, a Frenchman, author of a treatise, entitled *Enchiridion Botanicum Parisense*, and of a History of Canada plants.
- Paullinia*, Lin. from Pauli, a Danish botanist, author of two treatises, entitled *Quadripartitum Botanicum*, and *Viridaria varia*.
- Stapelia*, Lin. from Stapel, a Dutchman, author of some botanical works, particularly a Description of Theophrastus's plants.
- Læselia*, Lin. from Læfel, a Prussian, author of a Flora, or Enumeration of the Plants that are natives of Prussia.
- Zanonis*,

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- Zanonia*, Lin. from Zanoni, an Italian, author of a Treatise on the Alpine Plants.
- Morisona*, Plum. from Dr. Robert Morison, author of an Universal History of Plants, and several other curious botanical works.
- Bontia*, Plum. from Bontius, an ingenious Dutch botanist, author of a Natural History of the East Indies.
- Aldrovanda*, Monti, from the celebrated Italian naturalist Ulysses Aldrovandus.
- Bocconia*, Plum. from Paul Boccone, a native of Sicily, author of a Treatise on the rare and curious Plants of that island, and of some other botanical works.
- Muntingia*, Plum. from Abraham Munting, a Dutch naturalist of the 17th century, author of some ingenious botanical works, particularly *Phytographia curiosa*, *Aloc-darium*, and *de Britannica Herba*.
- Tillandsia*, Lin. from Tillands, a Swedish botanist, author of a Catalogue or Enumeration of the Plants that are Natives of Abo.
- Breynia*, Plum. from John Breyn, or Breynius, a native of Poland, author of a Dissertation on Ginseng.
- Petiveria*, Plum. from Mr. James Petiver, an apothecary of London, author of a British Herbal, and many other curious botanical works.
- Dodartia*, Tourn. from M. Dodart, a Frenchman, author of Memoirs towards a History of Plants. His plates, forty-five in number, are reckoned excellent.
- Commelina*, Plum. from John Commelyn, a Dutchman, who, besides the share which he took in the publication of that splendid work, the *Hortus Malabaricus*, is likewise author of *Hesperides Belgica*, and *Hortus Amstelodamensis*.
- Rheede*, Plum. from Henricus van Rheede van Drakestein, a Dutchman, governor of Malabar, who published, at his sole expence, in 1676, the celebrated *Hortus Malabaricus*, in 12 vols. folio.
- Mentzelia*, Plum. from Christian Mentzel, or Mentzelius, a Prussian, author of an Index of rare and curious Plants.

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- Sibbaldia*, Lin. from Robert Sibbald, a Scotchman, who lived in the 17th century, and published a Natural History of Scotland under the title of *Scotia illustrata*.
- Triumfetta*, Plum. from John Baptist Triumfetti, an Italian, author of a Treatise on Vegetation, and other botanical works.
- Magnolia*, Plum. from Peter Magnol, professor of botany at Montpellier.
- Rajania*, Plum. from Mr. John Ray, the father of English botany.
- Hermannia*, Tourn. from Dr. Paul Herman, a Saxon, professor of botany at Leyden, and author of an ingenious method, with several other curious works,
- Knautia*, Lin. from Christian Knaut, a Saxon, author of a Botanical Method.
- Rivina*, Plum. from Rivinus, a Saxon, professor of botany at Leipzig, and author of an Easy Method of classing Plants.
- Marchantia*, March. from M. Marchant, a Frenchman, author of some ingenious papers in the Memoirs of the Academy of Sciences.
- Plukenetia*, Plum. from Mr. Plukenet, an ingenious English botanist, in whose works are descriptions of eight thousand seven hundred plants, with two thousand seven hundred figures.
- Plumeria*, Tourn. from Father Plumier, an ingenious Frenchman, noted for his discoveries of American plants.
- Tournefortia*, Plum. from M. Pitton de Tournefort, the illustrious French botanist.
- Volkameria*, Lin. from George Volkamer, a German, author of the *Flora Norimbergensis*.
- Camellia*, Lin. from George Camellus, a Jesuit, author of some ingenious papers in the English Philosophical Transactions, and of a treatise *de fabâ Ignatii sive vomicâ*.
- Rudbeckia*, Lin. from M. Rudbeck, a Swede, author of a botanical work, entitled, *Campus Elysius*.
- Rumphia*, Lin. from Rumphius, a Dutchman, author of the *Herbarium Amboinicum*.

Scheuchzeria,

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- Scheuchzeria*, Lin. from J. James Scheutzer, or Scheuchzer, a Swiss, professor of botany, author of an Arrangement of the Grasses ; a Journey over the Alps ; and a Treatise entitled *Physica sacra*.
- Sloanea*, Plumier, from Sir Hans Sloane, the celebrated English physician and naturalist.
- Boerhaavia*, Vaill. from the very eminent Dr. Boerhaave, professor of physic and botany at Leyden.
- Zanichellia*, Lin. from Zanichelli, an Italian, author of a History of Plants.
- Heucheria*, Lin. from Heucher, a German, author of an Index or Catalogue of the Plants in the Botanical Garden at Wittemberg, and of a Treatise *de Vegetabil. magicis*.
- Nissolia*, Jacquin. from Nissole, an ingenious Parisian, author of several papers in the Memoirs of the Academy of Sciences.
- Reaumuria*, Hasselquist, from M. de Reaumur, an ingenious French academician and naturalist.
- Kæmpferia*, Lin. from Dr. Kæmpfer, a German, author of the History of Japan ; the curious Dissertations on Tea, and *Morus Papyrifera* ; and the ingenious collection known by the name of *Amœnitates Exoticæ*.
- Jussiea*, Lin. from Messrs. Antony and Bernard Jussieu, two ingenious French botanists, authors of several excellent papers in the Memoirs of the Academy of Sciences at Paris.
- Barleria*, Plum. from Jacob Barrelier, a Frenchman, author of a History of the Plants of France, Spain, and Italy.
- Feuillea*, Lin. from Feuillé, a Frenchman, author of a History of the Plants of Chili and Peru.
- Marfilea*, Lin. from Marfili, an ingenious Italian, author of a Dissertation on the Generation of Mushrooms.
- Garidella*, Tourn. from Garidel, a Frenchman, author of the History of the plants of Provence.
- Isnarda*, Lin. from Danti d'Isnard, a Frenchman, author of some botanical papers in the Memoirs of the French Academy of Sciences.
- Valantia*, Tourn. from M. Vaillant, an ingenious French-

- man, author of a Treatise on the Structure of Flowers, and of several curious botanical papers in the Memoirs of the French Academy.
- Ruppius*, Lin. from Ruppius, a German, author of the *Flora Jenensis*, and of an Improvement of Rivinus's Method.
- Pontederia*, Lin. from Pontederia, an Italian, author of some botanical dissertations, and of a method which combines those of Tournefort and Rivinus.
- Montia*, Micheli, from Monti, an Italian, author of a work entitled *Prodromus Stirpium agri Bononiensis*.
- Dillenia*, Lin. from Dillenius, a German botanist, noted for his Observations on the Mosses, Mushrooms, and Sea-weed: he is likewise author of the *Flora Giffensis*, and *Hortus Ellhamensis*.
- Frankenia*, Lin. from John Frank, a physician of Ulin, and author of a Treatise on Male-Balsam-Apple, and Water-germander.
- Buxbaumia*, Lin. from Dr. Buxbaum, a German, author of an Enumeration or Catalogue of the Plants around Hal, in Saxony, and of five centuries of eastern plants.
- Heisteria*, Jacquin. from Heister, a German, author of a Treatise on the Utility of the Leaves, and of a System which seems to have been suggested by that of Ray.
- Tillea*, Micheli, from Tilli, an Italian, author of a Catalogue of the Plants in the Gardens of Pisa.
- Martynia*, Houston, from Mr. John Martyn, professor of botany at Cambridge, author of a Commentary on Virgil's Bucolics and Georgics, and of several other botanical tracts.
- Hamellia*, Jacquin, from M. Duhamel de Monceau, an ingenious Frenchman, author of la Physique des Arbres, Traité des Arbres Fruitières, and some other valuable works in botany, gardening and husbandry.
- Krameria*, Loeßling, from Kramer, a German, author of a work entitled *Tentamen Botanicum*.
- Michelia*, Lin. from Micheli, an Italian, noted for his Observations on Mushrooms and Sea-weed; he is likewise author

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- author of a Catalogue of the Plants cultivated in the Botanical Garden at Florence.
- Catesbaa*, Lin. from Mr. Catesby, who discovered it, author of a Natural History of Carolina.
- Milleria*, Houston, from Mr. Philip Miller, author of the Gardener's Dictionary and Calendar.
- Burmanna*, Lin. from Dr. John Burman, professor of botany at Amsterdam, and author of several botanical works, particularly a Description of two hundred Plants from the Cape of Good Hope.
- Houstonia*, Lin. from the ingenious Dr. William Houston, who discovered several curious plants in the West-India islands.
- Linnaea*, Gronovius, from the celebrated naturalist, Sir Charles Linné, late professor of botany at Upsal in Sweden.
- Waltheria*, Lin. from Augustus Frederic Walther, a German, professor of botany at Leipzig, and author of a Catalogue entitled *Hortus Waltheri*.
- Ludwigia*, Lin. from Dr. Christopher Ludwig, professor of botany at Leipzig, and author of some very ingenious works, particularly Botanical Institutions, in which is proposed a method that combines together the very different methods of Linnæus and Rivinus.
- Weinmannia*, Lin. from Weinman, a German, author of a large botanical work, in ten volumes, folio, with plates beautifully coloured.
- Sigesbeckia*, Lin. from Dr. Sigesbeck, of Petersburg, author of the *Flora Petropolitana*, and of two ingenious methods for arranging plants.
- Ammannia*, Houston, from John Amman, a Russian, author of a work entitled *Stirpes rariores Rutenicae*.
- Royena*, Lin. from M. Adrien Royen, professor of botany at Leyden, author of the *Flora Leidenfis*, in which he has suggested the idea of a natural method.
- Seguieria*, Loeßling, from M. Seguiet, a Frenchman, author of the *Bibliotheca Botanica*, and *Plantæ Veronenses*.
- Halleria*, Lin. from the very learned Dr. Albert Haller, Professor

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professor of botany at Gottingen, and author of a Natural Method.

Sauvagesia, Lin. from M. Sauvages, an ingenious Frenchman, author of a Method founded upon the Leaves.

Guettarda, Lin. from M. Guettard, a Frenchman, author of ingenious Observations on Plants.

Gmelina, Lin. from John Gmelin, a German, author of the *Flora Sibirica*, and of a Voyage to Siberia.

Wachendorfia, Lin. from Wachendorf, professor of botany at Utrecht, and author of a Natural Method of arranging Plants.

Ehretia, Brown, from Ehret, a German, who, in 1748, published at London, in folio, a work entitled *Plantæ rariores*, with twenty-six excellent figures illuminated.

Gleditsia, Lin. from Gleditsch, a German, professor of botany at Berlin, and author of an Arrangement of the Mushrooms, and of a History of the Academy of Sciences at Berlin.

Trewia, Lin. from Trew, a German, professor of botany at Nuremberg, author of a work entitled *Plantæ selectæ, decuriæ quatuor*, with forty-three excellent figures illuminated.

Hillia, Jacquin and Lin. from Sir John Hill, author of the Vegetable System, and of several other well-known botanical works.

Allionia, Loeßling, from Allioni, an Italian, author of a History of the Rare Plants of Piedmont, and of a Methodical Synopsis of the Plants in the Garden at Turin.

Brownæa, Jacq. from Mr. Brown, author of the Civil and Natural History of Jamaica.

Adansonia, Lin. from M. Adanson, a Frenchman, author of a Voyage to Senegal; a work entitled *Familles des Plantes*; several papers in the Memoirs of the French Academy; and a Treatise upon the Baobab of Prosper Alpinus, which plant it is that Linnæus has distinguished by the name of *Adansonia*, in honour of this gentleman.

Halesia, Lin. and Ellis, from the reverend and celebrated

Dr.

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- Dr. Stephen Hales, author of *Vegetable Statics*, justly filed the Modern Theophrastus.
- Queria*, Loeßling, from M. Quer, professor of botany at Madrid, and author of a Spanish Flora.
- Minuartia*, Loeßling, from M. Minuart, professor of botany at Cadiz.
- Gouania*, Jacquin, from M. Gouan, a Frenchman, author of the *Hortus Regius Monspeliensis*.
- Jacquinia*, from M. Jacquin, a German, author of a Catalogue of American Plants, published at Vienna in 1762. This gentleman undertook his botanical expedition to the West Indies, by the desire, and at the expence of the emperor. He was afterwards, as I am informed, professor of botany at Augsburg.
- Maranta*, Plum. from Bartholomew Maranta, an ancient obscure botanist.
- Kalmia*, Lin. from Dr. Peter Kalm, professor of botany at Abo in Finland, and author of *Travels in North America*.
- Solandra*, Lin. from the late Dr. Solander of the British Musæum, long a pupil of Linnæus at Upsal.
- Ellisia*, Lin. from the ingenious John Ellis, Esq. F. R. S. author of a *Natural History of Corallines*.
- Kuhnia*, Lin. from Dr. Kuhn of North America, a pupil of Linnæus.
- Gardenia*, Ellis, from Dr. Garden of South Carolina, an industrious botanist.
- Justicia*, Houston, from the late James Justice, Esq. principal clerk of session at Edinburgh, a curious florist, and author of some valuable tracts in gardening.
- Collinsonia*, Lin. from Mr. Peter Collinson, F. R. S. a lover and patron of the sciences, of the last century, who introduced this plant from America into the English gardens.
- Busonia*, Sauvage, from the ingenious M. de Buffon, a Frenchman, author of the celebrated *Natural History*.
- Coldenia*, Lin. from Dr. Colden of North America.

Brunia,

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- Brunia*, Lin. from M. le Brun, author of the Travels into Muscovy, Persia, and part of the East Indies.
- Hasselquistia*, Lin. from Dr. Frederic Hasselquist, an ingenious naturalist, and pupil of Linnæus, who travelled into Egypt, Arabia, and the Holy Land, in quest of natural curiosities. His papers were revised and published by Linnæus, after his death, under the title of *Hasselquist's Travels*.
- Loeflingia*, Lin. from P. Loeffling, a Swede, an ingenious pupil of Dr. Linnæus.
- Grewia*, Lin. from the celebrated Dr. Nehemiah Grew, author of the Anatomy of Plants.
- Malpighia*, Plumier, from Signior Malpighi, an ingenious Italian, of the 17th century, who communicated his discoveries on the internal structure of plants to the Royal Society at London, at the same time with Dr. Grew.
- Morina*, Tourn. from Dr. Morin of Paris.
- Monnieria*, Loeffling, from M. le Monnier, professor of botany at Paris.
- Laugeria*, Jacq. from M. Laugier, professor of botany at Vienna.
- Sibthorpia*, Lin. from Dr. Sibthorp, the late professor of botany at Oxford.
- Byttneria*, Loeffling, from M. Buttner, a Prussian botanist.
- Schwenckia*, David Van Royen, from M. Schwenke, author of a Catalogue of the Officinal Plants cultivated in the Physical Garden at the Hague, 8vo. 1752.
- Gronovia*, Houfflon, from M. Gronovius, a celebrated Dutch botanist, editor of the *Flora Virginica*.
- Varronia*, Brown, from Varro, the Roman, who lived about the time of Augustus Cæsar, and wrote some tracts on husbandry.
- Galenia*, Lin. from the celebrated Galen.
- Mesua*, Lin. from Mesue, an Arabian botanist, who lived in the end of the eighth century.
- Avicennia*, Jacq. from Avicenna, an Arabian physician and botanist of the eleventh century.

Averrhoa

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- Averrhoa*, Lin. from Averrhoes, a native of Corduba, in Spain, who lived in the eleventh century.
- Sarracenia*, Tourn. from Sarrazin, an ingenious Frenchman, who introduced several Canadian plants into the European Gardens.
- Ferraria*, Burmannus, from Ferrarius, an Italian botanist of the 17th century, author of a Treatise on the Culture of Flowers, published at Rome in 1740, with seventy-five excellent copper-plates.
- Cherleria*, Haller, from Cherlerus, a botanist of the sixteenth century, cotemporary with John Bauhin.
- Geoffraea*, Jacq. from M. Geoffroy, an ingenious naturalist of the last century, author of several excellent works, particularly a large Treatise on the Materia Medica.
- Moehringia*, Lin. from Moehring, an ingenious botanist of the last century, author of a Catalogue of the numerous plants cultivated in his own garden.
- Browallia*, Lin. from M. Browal, an ingenious botanist of the last century, author of a Defence of the Sexual System, in answer to Sigesbeck, who had attacked it with great spirit.
- Hebenstretia*, Lin. from M. Hebenstreit, a German, professor of botany at Leipzig, and author of a work entitled *Definitiones Plantarum*, published at Leipzig in 1731.
- Arteria*, Lin. from Peter Artedi, a learned Swedish naturalist, who was unfortunately drowned, at the age of thirty, in 1735. His posthumous works were published by Linnæus in 1738.
- Celsia*, Lin. from Olaus Celsius, an ingenious botanist of the last century, author of a book explaining the botany of the scriptures.
- Hottonia*, Boerhaave, from P. Hotton, author of a History of Botany.
- Sherardia*, Dillen. from Dr. William Sherard, a very eminent botanist of the seventeenth century, author of an Introduction to Botany, under the title of *Schola Botanices*. His *Hortus siccus*, or dried collection of plants, is said to have

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have consisted of twelve thousand species; that of Sloane contains only eight thousand.

Spigelia, Lin. from Adrian Spigelius, an Italian botanist, who lived in the beginning of the seventeenth century.

Jungermannia, Micheli, from Jungermannus, a botanist of the seventeenth century.

Garcinia, Lin. from M. Garcin, author of a History of Indian plants.

Cortusa, Boerhaave, from Cortusus, a botanist of the sixteenth century.

Cupania, Plum. from Cupanus, a botanist, who lived in the end of the seventeenth century.

Barreria, Lin. from M. Barrere, an ingenious botanist of the last century.

Stellera, Gmelin, from Steller, a botanist of the last century, who discovered it.

Lechea, Kalm. from M. Lech, an ingenious botanist of the last century.

Bobartia, Lin. from Dr. Bobart, of Oxford, who completed Morison's Universal History of Plants.

Bromelia, Plum. from Bromel, a French botanist of the seventeenth century.

Fagonia, Tourn. from Dr. Fagon, superintendant of the king's gardens at Paris.

Randia, Houston, from Mr. Isaac Rand, an ingenious English botanist.

Suriana, Plumier, from Joseph Surian of Marseilles, an eminent naturalist.

Tradescantia, Ruppius, from Mr. John Tradescant, an eminent English florist and antiquary.

Ximenia, Plumier, from Franciscus Ximenes, a Spanish botanist of the 17th century, author of a History of Mexican Trees and Plants.

Claytonia, Lin. from Dr. Clayton of Virginia, who discovered it.

Diervilla, Tourn. from M. Dierville, a French surgeon, who

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who introduced it into the European gardens, from Nova Scotia, where he discovered it.

Bartramia, Lin. from Mr. John Bartram of Philadelphia, who discovered it.

Bannisteria, Houston, from Mr. Bannister, an ingenious botanist, who travelled into Virginia in search of plants.

Gundelia, Tourn. from Dr. Gundelscheimer, who accompanied Tournefort in his travels to the East.

Knoxia, Lin. from Mr. Knox, author of a History of the Island of Ceylon.

Lippia, Houston, from Dr. Augustus Lippi, who travelled into Egypt and Abyssinia, in search of natural curiosities.

Mitchella, Lin. from Mr. Mitchel, who travelled into Virginia in quest of plants.

Oldenlandia, Plumier, from Henry Bernard Oldenland, a German botanist, who travelled into Africa in quest of plants.

Buddleia, Houston, from Mr. Buddle, an ingenious English botanist.

Tozzia, Micheli, from the Abbé Tozzi, a learned Italian.

Blasia, Micheli, from M. Blasi, an Italian monk, addicted to the study of botany.

Riccia, Micheli, from Signior Ricci, an Italian knight.

Moræa, Miller, from Robert More, Esq. of Shrewsbury, an ingenious botanist.

Blæria, Lin. from Dr. Patrick Blair, author of a book entitled Botanical Essays, and of several other curious tracts in botany and gardening.

Hopea, Garden, from the ingenious and accurate Dr. John Hope, late professor of botany at Edinburgh.

Hudsonia, Lin. from Mr. Hudson, author of the *Flora Anglica*.

XVIII. Generic names, of Greek origin, expressive of the essential character, habit, place of growth, and virtues, or sensible qualities of any plant, are, in Linnæus's opinion, preferable to all others.

The

The following names are expressive of the essential character.

Adenantha, Royen. (ἀδην, ἀδενος, a gland; and ἀνθη, the tops of the stamina) from its glandular tops.

Triopteris, Lin. (Τρεῖς, three, and πτερον, a wing) from each of its three seeds being furnished at top with an expansion resembling a wing.

Epilobium, Dillen. (ἐπι, upon, λοβος, a pod, and ἰον, a violet) from the flower being placed upon the *germen*, or seed-bud.

Helicleres, Lin. (ἑλιξ, a screw) from its twisted spiral fruit.

Tetracera, Lin. (Τεσσαρες, atticé, τετραρες, four, and Κερας, a horn) from the figure of its four capsules.

Trichosanthes, Lin. (Θριξ, Τριχος, hair, and ἄνθος, a flower) from the petals ending in long branched hairs.

Greek generic names expressive of the habit are more frequent. The following list is chiefly of this kind.

Glycyrrhiza, Tourn. (γλυκυσ, sweet, and ῥίζα, a root) from the sweetness of its root.

Ophiorrhiza, Lin. (ὄφης, a serpent, and ῥίζα, a root) from the convolutions of its root, resembling those of a serpent; or, more probably, from its pretended efficacy in curing the bites of serpents, and other venomous creatures.

Epidendrum, Lin. (ἐπι, upon, and δένδρον, a tree) from the plant growing naturally upon trees.

Leucadendron, Lin. (λευκος, white, and δένδρον, a tree) from the shining silver colour of the leaves.

Hæmatoxylum, Lin. (αἷμα, blood, and ξυλον, wood) from the beautiful red colour of its wood.

Zygophyllum, Lin. (ζυγός, a yoke, and φυλλον, a leaf) from the leaves being, as it were, yoked together, two and two upon the same foot-stalk.

Hydrophyllum, Tourn. (ὕδωρ, water, and φυλλον, a leaf) from the cavities of the leaves in spring being filled with water.

Eriocaulon,

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Eriocaulon, Gronovius. (ἐριον, wool, and καυλός, the stem) from its soft woolly stalks.

Eriocephalus, Dillen. (ἐριον, wool; and κεφαλή, the head) from its woolly leaves, which surround the stalks in clusters.

Rhodiola, Lin. (ῥόδον, a rose) from the smell of the roots, which resembles that of the rose.

Trigonella, Lin. (Τρεῖς, three, and γωνία, an angle) from its three cornered flower.

Crotalaria, Tourn. (κροτάλον, a rattle) from the branches that are furnished with pods being used by the infant-Indians for rattles.

Rhizophora, Lin. (ρίζα, a root, and φερω, to bear) from its branches bearing stringy roots, which penetrate into the earth or water.

Echinophora, Tourn. (εχῖνος, a hedge-hog, and φερω to bring, or bear) from its prickly fruit.

Eriophorum, Lin. (ἐριόφορος, bearing wool) from its fruit being furnished with long woolly hairs.

Acalypha, Lin. (καλός, beautiful, ἀ, not, and ἀφ᾽, touch) from the leaves, which sting, like those of nettles, upon being touched.

Alyssum, Tourn. (ἀλυσσω, to be disturbed in mind, to be mad) from its supposed efficacy in curing madness; whence, likewise, the English title of madwort.

Rhinanthus, Lin. (ῤιν, the nose, and ἄνθος, a flower) from the upper lip of its gaping petal resembling a nose, or the proboscis of an elephant.

Phyllanthus, Lin. (φυλλον, a leaf, and ἄνθος, a flower) from the flowers being produced upon the edges and under-side of the leaves.

Helianthus, Lin. (ἥλιος, the sun, and ἄνθος, a flower) from the obvious resemblance of its large flower to the disk or body of the sun; the florets in the circumference resembling the rays of that luminary.

Calophyllum, Jacquin. (καλός, beautiful, and φυλλον, a leaf) from the beauty of the leaves.

Liriodendrum, Lin. (λεῖριον, a lily, and δένδρον, a tree) from

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the fancied resemblance of its flowers to those of the lily.

Rhododendron, Lin. (ῥόδον, a rose, and δένδρον, a tree) from the resemblance of its flowers to those of the rose.

Myriophyllum, Vaillant. (μυρίος, infinite, and φύλλον, a leaf) from its numerous leaves.

Chrysanthemum, Tourn. (χρυσός, gold, and ἄθος, a flower) from the yellow colour of the florets.

Chrysocoma, Lin. (χρυσός, gold, and κομη, a bush of hair) from the foot-stalks being terminated with a head of flowers of a bright yellow colour.

Ophioglossum, Tourn. (ὄφις, a serpent, and γλῶσσαι, a tongue) from the fancied resemblance of its jointed spike of flowers to an adder's or serpent's tongue.

Cynoglossum, Tourn. (κύων, κύνος, a dog, and γλῶσσα, a tongue) from the leaves resembling, in figure, a dog's tongue.

Podophyllum, Lin. (πους, ποδός, a foot, and φύλλον, a leaf) from its bearing that particular kind of leaf called by Linnæus, foot-shaped.

Chrysophyllum, Lin. χρυσός, gold, and φύλλον, a leaf) from the leaves being of a beautiful gold-colour on their under-side.

Chærophyllum, Tourn. (χαίρω, to rejoice, and φύλλον, a leaf) from the exhilarating quality of the leaves.

Hæmanthus, Tourn. (αἷμα, blood, and ἄθος, a flower) from the beautiful-red colour of the flower.

Amaranthus, Tourn. (ἀ, not, and μαρμαίνω, to wither) from its flower not speedily withering after being cropped.

Cephalanthus, Lin. (κεφαλή, a head, and ἄθος, a flower) from the branches being terminated with small bunches or heads of flowers.

Chionanthus, Royen. (χιῶν, snow, and ἄθος, a flower) from the beautiful whiteness of its flowers.

Galanthus, Lin. (γάλα, milk, and ἄθος, a flower) from the milky whiteness of its flowers.

Melianthus, Tourn. (μέλι, honey, and ἄθος, a flower) from the flower being filled with a sweet substance like honey.

Chrysobalanus,

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Chrysobalanus, Lin. (χρυσός, gold, and βαλανός, a plumb, or cherry) from the red, or yellow colour of its fruit.

Lithospermum, Tourn. (λίθος, a stone, and σπέρμα, a seed) from its hard stony seeds.

Ceratocarpus, Buxbaum. (κέρας, a horn, and καρπός, fruit) from its capsule or seed-vessel and seeds being furnished with an appearance like two horns.

Melampyrum, Tourn. (μέλας, black, and πυρός, wheat) from the colour of its seeds or grains, which, in form, resemble those of wheat.

Osteospermum, Lin. (ὀστέον, a bone, and σπέρμα, a seed) from its hard bony seeds.

Conocarpus, Jacquin. (κωνός, a cone, and καρπός, fruit) from its seed-buds being collected into a cone.

Tragopogon, Tourn. (τράγος, a goat, and πώγων, a beard) from the resemblance of its seeds covered with the pappus or down to a goat's-beard.

Nyctanthes, Lin. (νύξ, the night, and ἄνθος, a flower) from the flowers opening at night, and falling in the morning.

Melanthium, Lin. (μέλας, black, and ἄνθος, a flower) from the colour of the flower, which is a dark brown.

Agave, Lin. (ἀγαυός, admirable) from its superb and beautiful appearance.

Erythronium, Lin. (ἐρυθρός, red, and ἴον, a violet) from the beautiful colour of its flowers.

Clematis, Lin. (κλήμα, a little vine, a climber) from its supporting itself, like the vine, upon the bodies in its neighbourhood.

Gnaphalium, Vaillant. (γνάφαλον, the fine white downy appearance to be observed on the surface of many plants) from its soft downy leaves and stalks.

Aster, Tourn. (ἀστὴρ, a star) from the figure of the flower.

Hypocoum, Tourn. (ὑπηχέω, to resound) from the seeds being thrown out of their jointed pod, or capsule, with velocity and a considerable noise.

Oxalis, Lin. (ὀξύς, four) from the acidity of its leaves.

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- Parthenium*, Lin. (παρθεν[⊙], a virgin) from its efficacy in disorders of the womb.
- Heliotropium*, Tourn. (ἡλι[⊙], the sun, and τρεπω, to turn) from the flower always turning its disk to the sun, and following its direction.
- Leucoium*, Ruppium. (λευκός, white, and ἴον, a violet) from the beautiful whiteness of the flower.
- Ipomœa*, Lin. (ἰψ, ἰπ[⊙], the flower called convolvulus, and ὁμοίος, like) from the great resemblance of its flower to that of convolvulus, or bi. d. weed.
- Bunias*, Lin. } (βεν[⊙], a little hill) from the native soil of
Bunium, Lin. } the plants.
- Sideroxylum*, Dillen. (σιδηρ[⊙], iron, and ξυλον, wood) from the hardness and firm texture of the wood, which is so weighty as to sink in water.
- Aphanes*, Lin. (ἀφανής, not conspicuous) from the minuteness, and low stature of the plant.
- Pteris*, Lin. (πτερόν, a wing) from the divisions of the smaller leaves resembling wings.
- Lythrum*, Lin. (λυθρον, blood, gore) from the deep purple colour of the flowers.
- Orchis*, Tourn. (ὄρχις, a testicle) from the fancied resemblance of its roots.
- Cotyledon*, Tourn. (κοτύλη, a cavity) from the leaves being hollowed, like the navel.
- Phallus*, Micheli (φαλλ[⊙], the yard) from the peculiar figure of this mushroom.
- Xeranthemum*, Tourn. (ξηρός, dry, and άνθ[⊙], a flower) from the extreme dryness of the petals; a circumstance which preserves the beauty of the flowers for many months. Hence it is termed, in English, everlasting, or the eternal flower.
- Adoxa*, Lin. (ἀ, not, and δόξα, glory) from its diminutive appearance and want of beauty.
- Anihoxanthum*, Lin. (άνθ[⊙], a flower, and ξανθ[⊙], yellow,) from the yellowish colour of the spike of flowers.
- Sphæranthus*, Vaillant. (σφαῖρα, a sphere, or globe, and άνθ[⊙], a flower) from its globular head of flowers.
- Siphonanthus*,

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- Siphonanthus*, Lin. (σιφων, a syphon, or tube, and ἀνθός, a flower) from its long tubular petal.
- Mesembryanthemum*, Dillen. (μέσος, the middle, ἡμέρα, a day, and ἀνθός, a flower) from the flowers of this genus opening in the middle of the day. Linnæus derives it from the flower being seated upon the germen, or seed-bud, in Greek, ἐμβρύων. Either etymology is expressive of a characteristic of the genus in question.
- Sideritis*, Tourn. (σιδηρός, iron) from the plants of this genus being vulnerary, and of especial efficacy in wounds made by the sword.
- Camphorosma*, Lin. (ὄσμη, a smell) from its having the smell of camphire.
- Polypodium*, Tourn. (πολύς, many, and πῦς, a foot) from its roots serving the office of feet, by penetrating into whatever they can lay hold of, and thus supporting the plant.
- Asplenium*, Lin. (ἀ, priv. and σπλήν, the spleen) from its efficacy in diseases of the spleen.
- Diosma*, Lin. (Ζεὺς, διός, Jupiter, and ὄσμη, a smell) from the very agreeable odour of the plants of this genus.
- Dracontium*, Lin. (δράκων, a dragon) probably from the protuberances of the stalks, which are of different colours, and thine like the body of a serpent.
- Echium*, Tourn. (ἔχίς, a viper) from its seeds when ripe resembling the head of a viper.
- Geranium*, Tourn. (γέρανος, a crane) from the fancied resemblance of its permanent style to a crane's bill.
- Hieracium*, Tourn. (ἱέραξ, a hawk) from a vulgar opinion that the juice of these plants is used by hawks to remove any occasional films from the eyes of their young.
- Cardiospermum*, Lin. (καρδία, the heart, and σπέρμα, a seed) from the seeds being marked at the base with a heart.
- Heliocharis*, Lin. (ἥλιος, the sun, and καρπός, fruit,) from the resemblance of the threads which surround the borders of the capsule to the rays of the sun,
- Trichostema*, Gronovius, (τριχίς, τριχός, hair, and στήμων, a stamen, or thread) from its long slender stamina resembling hairs.
- Dianthera*, Gronovius. (δύς, twice, and ἀνθερά, the top of the

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- the flamen) from its having two *anthers* upon each filament.
- Elæocarpus*, Burman. (ἐλαία, an olive, and καρπός, fruit) from the resemblance of its fruit to that of an olive.
- Buphthalmum*, Tourn. (βους, an ox, and ὀφθαλμός, an eye) from the fancied resemblance of its large compound flower to that of an ox-eye.
- Dracocephalum*, Tourn. (δράκων, a dragon, and κεφαλή, the head) from the figure of the flower.
- Diospyros*, Lin. (Ζεύς, δῖος, Jupiter, and πυρρός, wheat) from the excellence of the plant.
- Dipsacus*, Tourn. (διψάω, to thirst) probably from the leaves collecting water in their cavities, and thus preventing the injuries which might arise to the plant from aridity.
- Stachys*, Tourn. (στάχυς, a spike, or ear of corn) from its flowers being produced in long spikes.
- Ceratonia*, Lin. (κεράτιον, a pod, à Κερας, cornu, quia filiqua est quasi corniculata) from its bearing pods. It was formerly termed *filiqua*, the pod by way of eminence; Linnæus has changed that name for a Greek one of the same import.
- Platanus*, Tourn. (πλατύς, large, ample) from the great dimensions of the trees of this genus.
- Tribulus*, Tourn. (τρίβολοι, caltrops,) from its prickly fruit.
- Tblaspi*, Tourn. (θλαω, to compress, to squeeze together) from its flat compressed seed-vessel.
- Panax*, Lin. (πᾶν, every, and ἄκμα, a medicine or remedy) from its boasted efficacy in medicine.
- Iatropa*, Lin. (ιατρός, a physician, and φάγω, to eat) from the plant being used both for food and physic.
- Capficum*, Tourn. (καπτω, to bite) from its hot acrid quality.
- Azalea*, Lin. (ἄζαλέος, dry, torrid) from its delighting in a dry parched soil.
- Origanum*, Tourn. (ὄρεος, a mountain, and γὰν, delight, joy) from its native soil.
- Typha*, Tourn. (τιφός, a marsh) from its growing naturally on wet boggy ground.

Cypripedium, Lin. (κύπρις, one of Venus's names, and ποδῖον, a shoe, or slipper) from the obvious resemblance of the nectarium of the flower to a slipper.

Delphinium, Tourn. (δελφίν, a dolphin) from the fancied resemblance of the flowers, before expansion, to the fish called a dolphin.

Hyoſcyamus, Tourn. (ὕς, a swine, and κύαμῶν, a bean) *quasi* hog-bean.

Hippomane, Loeſſing, (ἵππῶν, a horſe, and μανία, madneſs) from the noxious quality of the plants of this genus.

Hippocrepis, Lin. (ἵππῶν, a horſe, and κρηπίς, a laſt, like- wiſe a horſe-ſhoe) from each joint of the pod reſembling a horſe-ſhoe.

Tragacantha, Tourn. (τράγῶν, a goat, and ἀκανθα, a thorn) from the plants being armed with long ſharp thorns.

Chelone, Tourn. (χελώνη, a tortoiſe) from the figure of its ſeeds, which are round, compreſſed, and begirt with a membranaceous rim, or border.

Bupleurum, Tourn. (βούς, an ox, or cow, and πλευρὸν, a rib, ſide, or breaſt) from a vulgar opinion that theſe plants burſt the bellies of cows, which eat of them.

Chryſſplenium, Tourn. (χρυσῶν, gold, and σπλήν, the ſpleen) from the flowers being of a golden colour, and of ſuppoſed efficacy in diſeaſes of the ſpleen.

Adiantum, Tourn. (ἀ, not, and δαίνω, to wet, or moiſten) probably from its growing out of the clefts of rocks, and in a ſandy ſoil, ſo as not to require any quantity of moiſture.

Æſchynomene, Lin. (αἰſχύνομαι, to be aſhamed, or ἰſχω, to contract) from its reſemblance to the ſenſitive plant, which is ſometimes diſtinguiſhed by this appellation.

Mimosa, Tourn. (μίμῶν, a mimic) from its imitating the motions of animals.

Polygala, Tourn. (πολὺν, much, and γάλα, milk) from its increaſing the quantity of milk to cows which feed on it.

Galium, Tourn. (γάλα, milk) from the property poſſeſſed by ſome plants of this genus, of coagulating milk.

Poterium, Lin. (ποτήριον, a cup, or bowl) from its being

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put into cool tankard in summer, to give the wine an agreeable flavour.

Picris, Lin. (πικρὸς, bitter) from its bitter taste,

Glycine, Lin. (γλυκὺς, sweet) from the leaves having a sweet taste like that of liquorice.

Rheum, Lin. (ῥέω, to flow) from its purgative quality.

Aizoon, Lin. (ἀεί, always, and ζῶον, alive) from its duration.

Ornithopus, Lin. (ὄρνις, a bird, and πῦς, a foot) from its bended and pointed pods exactly resembling the toes of a bird's foot.

Aconitum, Tourn. (ἀκόννη, a cliff, a rugged rock) from its native soil.—Thus Ovid, in speaking of the venomous potion prepared for Theseus by Medea, from the plant produced by the white froth (*spumæ albentes*) of Cerberus, gives this etymology of its name,

“ Quæ quia nascuntur dura vivacia caute,

“ Agrestes ACONITA vocant,”

Metam. Lib. VII. 418.

From the above lists are excluded such names as are not of obvious origin, and where the etymology, though sufficiently perspicuous, is not expressive of any striking character or circumstance in the genus in question. Perhaps there is some degree of impropriety in having dwelt so long upon a barren and unentertaining subject like that of names: but, as the present work is chiefly designed for the use of the unlearned botanist, an explanation of the modern generic nomenclature seemed, in some sort, necessary, as, however liable to censure, it bids fair to be permanent.

XIX. Generic names of an immoderate length, or of difficult and harsh pronunciation, are, by all means, to be avoided. For these reasons Linnæus has very properly changed the

<i>Kalophyllodendron</i> — <i>Stachyarpogophora</i> — <i>Caraxeron</i> — <i>Myrobatindum</i> — <i>Hydroceratophyllon</i> —	} } } } }	of Vaillant, for	{ { { { {	<i>Calophyllum</i> . <i>Celosia</i> . <i>Gomphrena</i> . <i>Lantana</i> . <i>Ceratophyllum</i> .
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Microleuconympha — } of Boer- { *Hydrocharis*.
Hypophyllocarpodendron } haaye, for { *Leucadendron*.

Coriistragematodendros of Plukenet, for *Myrica*.
Orbitochortus — — of Knaut, for *Fagonia*.

Eupatoriophalacron — } of Dillenius, { *Verbefina*.
Galeobdolon — — } for { *Galeopfis*.

Pterospemadendron — of Ammannus, for *Pentapetes*.
Acrochordodendros — of Plumier, for *Cephalanthus*.

XX. Terms of art are not to be used as generic names.
Hence Linnæus has changed

<i>Tuberosa</i> — — —	}	for	{	<i>Polianthes</i> .
<i>Spica</i> — — —				<i>Lavandula</i> .
<i>Siliqua</i> — — —				<i>Ceratonía</i> .
<i>Nux</i> — — —				<i>Iuglans</i> .
<i>Odorata</i> — — —				<i>Scandix</i> .

XXI. Generic names, which are not of Greek or Latin origin, are, according to Linnæus, to be excluded from the nomenclature of botany. This rule, which indeed serves as a foundation to all the others, has been severely criticised by some modern authors. It has been said that the term barbarous, which Linnæus applies to all the Indian, African, American, and foreign names of genera, may, with equal justice, be applied, by those nations, to our learned European names, which to them are as little expressive of the essential character, or habit of the plants in question, as theirs are to us; that they ought, therefore, to be deemed equivalent to the Greek and Latin names, and be adopted, unless when immoderately long, or of harsh and difficult pronunciation. The same authors have disputed the necessity of employing generic names expressive of any character or circumstance in the parts of plants, much more of burdening the nomenclature with a profusion of names in honour of botanists, unless where the merit of the man has been

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Ribes, Doronicum, Thea, Coffea, Cassine, Annona, Mammea, Chara, Pothos, Basella, Hura, Yucca, Guaiacum.

Names of the Species.

Since the time of Caspar Bauhin, the different species of plants have been distinguished by certain short descriptions, or phrases, expressive of some circumstance in their external form or habit. These descriptions, which have been very improperly denominated specific names, Linnæus has subjected to the same rules with the names of classes and genera. The essential difference of each species is to be expressed in the name or definition, which is intended to discriminate the species in question from all the plants of the same genus, and from none others.

The description of the species termed the specific name, and which, in Linnæus's opinion, ought never to exceed twelve words, is preceded by the trivial name, which always consists of one word placed after the generic name, and is not subjected to the same constraint as the names of the classes and genera, and descriptions of the species. In the following examples the generic name is marked in small capitals, the specific in Roman characters, the trivial in Italic.

Generic name. Trivial name.

RHODODENDRON *ferrugineum.*

PYROLA *secunda.*

PYROLA *umbellata.*

PYROLA *uniflora.*

MAGNOLIA *grandiflora.*

MAGNOLIA *glauca.*

Specific name.

RHODODENDRON foliis
glabris subtus leprosis,
corollis infundibuli-
formibus.

PYROLA racemis uni-
lateralibus.

PYROLA pedunculis sub-
umbellatis.

PYROLA scapo unifloro.

MAGNOLIA foliis lan-
ceolatis perennantibus.

MAGNOLIA foliis o-
vato-oblongis subtus
glaucis.

HEBENSTRETIA

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Generic name. Trivial name.	Specific name.
HEBENSTRETIA <i>dentata</i> .	HEBENSTRETIA foliis dentatis.
HEBENSTRETIA <i>cordata</i> .	HEBENSTRETIA foliis subcarnosis, cordatis, fessilibus.
PYRUS <i>Malus</i> .	PYRUS foliis ferratis, umbellis fessilibus.
PYRUS <i>Cydonia</i> .	PYRUS foliis integerri- mis, floribus solitariis.

From the first, third, fourth, sixth, seventh and eighth of the above examples, it is evident that the trivial name is frequently an abbreviation of the specific ; and as this last contains the essential difference, where such difference is conspicuous, the trivial name is an abridgment of that difference, where such abridgment can be conveniently contained in one word.

When two or three genera of former authors are absorbed by one, it is common to see the names of those genera retained as trivial names. Thus, in the two last examples, MALUS and CYDONIA, two genera of Tournefort, are converted into trivial names, for characterizing the most common species of each respective genus. Such trivial names have always a capital for their initial letter.

The distinction of specific and trivial names suggested by Linnæus deserves particular attention, the rather as many circumstances, deemed improper for entering into the description, or specific name, are employed without reserve for the trivial.

So extraordinary a measure required some explanation : but Linnæus has thought fit to be silent on that head. He has judged very properly ; for no satisfactory reason could be assigned for so glaring an inconsistency.

In fact, what can be more absurd, than to characterize a plant by a circumstance, which is either accidental and inconstant, or, at best, deemed unworthy of a place in its description ! yet, half the trivial names in the *Species Plantarum* are

are of this kind. Not that these names are totally to be rejected; many of them being highly proper and significant; but we must disapprove and condemn the sophistry of Linnæus, who would excuse, and even applaud, in himself, what he so severely censures in others.

This being premised, we proceed to lay down Linnæus's general principles or aphorisms on this subject.

I. Genuine specific differences are afforded by the root, trunk, leaves, fulcra, mode of flowering, and such circumstances of the parts of fructification as are unconnected with the generical description.

II. The specific name ought to be expressive of characters inscribed, as it were, upon the plant itself. All accidental marks, therefore, not existing in the plant, or not conspicuous in its appearance, are to be excluded from the specific difference.

III. Magnitude being subject to variations, from place, soil, climate, and other circumstances, is not to enter into the specific difference.

IV. Specific names are by no means to be employed, which pre-suppose a knowledge of other species of a different genus. Former botanists, says Linnæus, constructed their specific differences in such a manner, as if those for whom they wrote had been previously acquainted with most of the European plants. Their descriptions are frequently comparisons of the plants in question with those of their own country. Thus such a plant had a hawk-weed leaf; another had the leaf of the willow; a third of groundsel; one had the appearance of balm; another of wormwood. Such characters Linnæus disclaims. A plant, in his opinion, ought to be known by the name assigned to it; and the name to be suggested by the appearance of the plant. Each is to be discovered by its proper character, written in the one, delineated in the other. Names, he continues, pre-supposing other plants, have always a tendency to lead those who use them into an error similar to what Logicians call *committing the circle*.

Notwithstanding this shew of reasoning, I believe it will be

be found that specific differences from comparison with plants, or the parts of plants, generally known, make a much stronger impression, and lead more directly to the knowledge required, than the most accurate description of characters existing in the plant itself.

V. Specific names, pre-supposing a knowledge of other species of the same genus are, for the same reason, proscribed from the modern nomenclature of botany. Hence the following names are censured by Linnæus,

Orchis flore candidissimo, Tourn.

Campanula angustifolia, magno flore, minor, Tourn.

Campanula, flore minore, ramosior, Morison.

A beginner is not supposed to know of any species of campanulæ, that is less branched, or of orchis, whose flowers are less white. Such names too, from their very nature, are fluctuating. In fact, the establishment of specific names upon a solid foundation, must be preceded by a knowledge of all the species of any particular genus. For as the essential difference of any species manifestly implies a character peculiar to that species, and which does not exist in any of its congeners; it is evident that the discovery of a new species possessing a common character, must bring the essential difference in question to an end.

To illustrate this by an example. The essential character of a species of winter-green is described by Linnæus to be a naked stalk supporting a single flower. By this description the species in question is essentially distinguished from all the species of winter-green yet known. But, supposing another species should be discovered with a naked stalk and a single flower, the specific name just mentioned would no longer be an essential difference; another must be substituted; and that, perhaps, in consequence of further discoveries, must give place to a third. This observation sufficiently accounts for the numerous alterations in every edition of the *Species Plantarum*; and has almost convinced me of the necessity of employing proper specific names, not expressive of any essential difference whatever, nor, of consequence,

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sequence, subject to continual variation from future discoveries.

VI. The name of the discoverer or describer of any plant is not to enter into the specific difference. On this account, the following specific names are rejected from the modern nomenclature:

Trifolium gastonium of Morison.

Gramen cyperoides Bælii of Lobelius.

Conyza tenuis Dioscoridis of C. Bauhin.

Conyza media Matthioli of I. Bauhin.

Narcissus Tradescantii of Rudbeckius.

The following are liable to censure for a similar reason;

Sideritis Valerandi Dourez } of I. Bauhin.
Campanula a Tossano Carolo missa }

Minosa à Domino Hermans missa of Breynius.

Amanita Divi Georgij of Dillenius.

Chamæpithys flore plusquam eleganti, }
feu Plufqueneti, } of Plukenet.
Eriocephalus Bruniades, }

VII. The place of growth, or native soil of any plant is not an essential character; and, therefore, ought to make no part of the specific difference. No one, says Linnæus, would chuse to make a voyage to Japan, the Cape of Good Hope, or Peru, to be satisfied of the accuracy of the description of a plant. Besides, the same species is often produced in very different soils, and in regions the most distant from one another. The Alpine plants are not rarely found in the fens; nay, Lapland, Siberia, Canada, Asia, and America, frequently produce the same individual species.

Improper, however, as the circumstances of soil, and place of growth, are deemed in a specific description, Linnæus has not scrupled, however inconsistently, to employ them upon several occasions in denominating the species. I said, however inconsistently; for if the soil, by reason of its being an accidental and variable circumstance, is deemed unworthy a place in the specific difference, how can it, with any propriety, enter into the abridged description, or trivial name?

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name? If a plant, which is a native of two very remote countries, as Guinea and Japan, cannot have its place of growth expressed in the description, is it proper to mislead the ignorant, by signifying in the title, or trivial name, that the plant in question is the produce of one particular country only, when, for the very opposite reason, its place of growth could not be mentioned in the specific description?

VIII. The time of flowering, duration, colour, taste, smell, and powers of plants, are very fallacious marks of distinction, and, therefore, to be totally excluded from the specific name.

IX. The generic name is to be applied and prefixed to each particular species, that the genus, as well as species, may be signified by the description, or specific name. Indeed, without the name of the genus, the specific difference is of no significancy. A mutilated description of that kind may be applicable to a hundred different plants, as the essential characters of the species are only intended to discriminate plants of the same genus, and may, therefore, be frequently possessed in common by plants of a different genus. To ascertain, therefore, the plant in question, beyond the possibility of a mistake, let the generic name be prefixed to each species, and announced with it. Morison and Ray, although they reduced the species under their respective genera, were seldom careful to adopt the generic name, but substituted a kind of proper specific name in its stead; so that a quotation from either of these authors, not suggesting an idea of the genus, becomes only intelligible by being consulted in their respective works. Thus to take an example from Ray. Under the generic name *STOECHAS* are arranged the following species.

- I. *Stoechas citrina germanica, latiore folio.*
- II. *Chrysocome Aethiopica, plantaginis folio.*
- III. *Helichrysum abrotani feminae foliis.*
- IV. *Helichrysum creticum.*
- V. *Stoechadi citrinae alteri inodorae Lobelij affinis.*
- VI. *Gnaphalium montanum album.*

Of these six species, the first only, and perhaps the fifth, is exempted from censure, as containing both the generic

and specific name: the rest, when viewed apart, would seem to have no connection with the genus under which they are arranged; but, on the contrary, appear to belong to other genera, *chrysocome*, *helichrysum*, and *guaphalium*, with which, in reality, they have no affinity.

Again, the generic name is not only to be applied, but to be prefixed to each species. The following specific names of Lobelius are faulty in this respect.

Minus heliotropium repens

Matthioli secundum limonium.

Aquatica plantago foliis betæ.

X. Specific names are, if possible, to exhibit the essential difference of each species. Where the essential characters of any species have not been investigated, other differences, less essential, but more numerous, are to be substituted in their place. Specific names of the latter kind are termed by Linnæus, synoptical, and are not to be admitted, unless in default of the essential name. The merits of each will best appear from comparison.

Synoptic name—*Salix foliis ferratis glabris ovatis acutis subsessilibus* of Royen.

Essential name—*Salix flosculis pendandris*, Lin. Flor. Lap.

Synoptic name—*Salix foliis subintegerrimis lanceolato-linearibus longissimis acutis, subtus sericeis; ramis virgatis.* Flora Suecica.

Essential name—*Salix foliis linearibus revolutis.*

From these examples it appears that the essential name consists of but two or three words, and is generally expressive of a single idea. We have seen, however, that even essential specific names, however excellent when compared with those termed synoptic, must always be inconstant, as long as a single species of any genus remains undetected. Indeed, were that obstacle removed, and every species characterized by an essential name, I should most heartily concur with Linnæus, that the science, at least, in one point, had reached perfection; but till that distant day arrive, and a distant day it must be from the very nature of things, we must rest satisfied with ascribing to those essential names, a degree of merit proportioned to their stability.

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XI. The excellence of the specific name, according to Linnæus, consists in its brevity. In this respect chiefly, the essential name, as containing a single idea, is preferable to the synoptical, in which the characters are numerous, but not striking. After all, it may be doubted, whether the ample descriptions of former authors, however severely censured by certain moderns, are not superior, in point of merit, to the short phrases, or specific differences, which are now so generally adopted; as these are not descriptive of any species considered by itself, but arise from a view of its resemblances and contrasts with others.

I close the subject of specific names with observing, that the differences in question are not always uniform; I mean, that the same idea does not predominate in the establishment of the species of any genus, the characters being seldom relative, or drawn from the same parts: in fine, that a comparison of opposition or contrast, is rarely either instituted or implied. This fault we must pronounce a capital one; and every page of the *Species Plantarum* affords striking evidences of its existence. The following are examples of the impropriety alluded to.

I. *LYTHRUM foliis linearibus alternis, floribus hexandris.*

LYTHRUM foliis linearibus alternis, floribus tetrapetalis.

II. *COTYLEDON foliis laciniatis, floribus quadrifidis.*

COTYLEDON foliis oblongis subteretibus, floribus fasciculatis.

III. *SEDUM foliis quaternis.*

SEDUM foliis planiusculis serratis.

The want of uniformity complained of will be best understood, by contrasting the above examples, with a few specific names of the same author, in which the opposition alluded to is carefully preserved.

I. *ROYENA foliis lanceolatis glabris.*

ROYENA foliis lanceolatis hirsutis.

II. *SCLERANTHUS calycibus fructus patulis.*

SCLERANTHUS calycibus fructus clausis.

III. *LILIUM foliis sparsis, corollis campanulatis, intus glabris.*

LILIUM foliis sparsis, corollis campanulatis, intus scabris.

A comparison of these two opposite sets of examples,

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will convince the reader of the excellence of the uniformity recommended, and render any further illustration unnecessary.

Names of the Varieties.

Varieties being only occasional modifications of the same species, the circumstance which constitutes the variety in any species is to be placed immediately after the specific name. Such circumstance, however, for the sake of distinction, should be delineated in a different character; in like manner as the specific name should stand distinguished from the generic. A few examples will illustrate the observation in question.

CONVALLARIA scapo nudo; *corolla plena.*

CONVALLARIA scapo nudo; *corolla rubra.*

SAXIFRAGA alpina ericoides; *flore purpurascens.*

SAXIFRAGA alpina ericoides; *flore cœrulea.*

In the above examples, the generic name is marked in small capitals; the specific in Roman characters; and the name of the variety in italics: a distinction which is absolutely necessary, to prevent the variable circumstance from being confounded with the specific difference. The same species of lily of the valley has sometimes a red, sometimes a full flower. This occasional difference does not enter into the specific name; it is expressive of a variety, and ought to be distinguished as such.

NUCAMENTUM. *Vide* AMENTUM.

NUDUS *Flos*, a naked flower; a flower so termed by Vaillant which wants the *calyx*, or flower-cup, but not the petals. The term, perhaps, would have been more properly applied to a flower wanting both calyx and petals, which are properly the cloathing or covers of the flower. Instances, however, of entire nakedness in flowers are very rare.

NUX, a nut; a species of seed, according to Linnæus, covered by a hard bony shell. The inclosed seed is termed the *nucleus*, or kernel.

OCTAN-

OCTANDRIA, (*ὀκτώ*, eight, and *ἄνθρωπος*, a man, or husband) the eighth class in Linnæus's Sexual System; consisting of plants with hermaphrodite flowers, which are furnished with eight stamina, or male organs of generation.

The orders, or secondary divisions of this class are four, and derive their names from the number of female organs possessed by the plants of each respective division.

French-willow, Indian-cress, heath, and tree-primrose have one style, or female organ.

Galenia, *weinmannia*, and *moeblingia*, have two styles.

Bistort and heart-feed have three styles; tuberous moschatel and one-berry, four.

OCULUS, an eye, a species of bud. *Vide* GEMMA.

ODOR, smell; the weakest and most obscure of the senses, as being different in almost every object, and variable in each. Dogs trace their masters with surprising facility at one time, and lose them with equal facility at another.

The ancients, according to Aristotle, recognized seven primitive or original smells, which, on account of their striking affinity to the simple tastes, were designed by the same names.

Smells being so extremely variable, admit of no determinate limits, and are, therefore, never to be employed in discriminating the species of plants. Hence such specific names as the following are very properly proscribed from the modern nomenclature of botany.

Hypericum hircinum (rank-smelling).

Melo moschatus (smelling of musk).

Hesperis noctu olens (smelling in the night).

Caryophyllus inodorus (without smell).

Ocimum caryophyllatum, C. Bauhin, (smelling of cloves).

—— *citri* odore (smelling of citron).

—— *anisi* odore (smelling of anise).

—— *fœniculi* odore (smelling of fennel).

—— *melissæ* odore (smelling of balm).

—— *rutæ* odore (smelling of rue).

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Ocymum cinnamomi odore (smelling of cinnamon).

For observations on smell, as indicative of the virtues and qualities of plants, the reader is referred to the article of taste, between which, and smell, there is, as we have said, a remarkable affinity. *Vide* SAVOR.

OLIGANTHERÆ (ὀλιγός, few; and ἀνθηρός, *floridus*, ab ἀνθός, *flos*) the name of the sixteenth class in Royen's Natural Method, consisting of plants with hermaphrodite flowers whose stamina are less in number than the divisions of the *corolla*, or equal to them. It includes several genera of the plain classes in the Sexual Method.

ORCHIDEÆ (orchis, the name of a well-known genus of plants). The seventh order in Linnæus's Fragments of a Natural Method, consisting of orchis, and the plants which resemble it in habit, powers, and sensible qualities.

List of the Genera contained in this Natural Order.

Linnæan Genera.		<i>English Names.</i>
<i>Arethusa.</i>		
<i>Cypripedium,</i>	—	— Ladies slipper.
<i>Epidendrum,</i>	—	— Vanilla, or vanelloe.
<i>Limodorum.</i>		
<i>Ophrys,</i>	—	— Bee-flower, bird's-nest, twy-blade.
<i>Orchis.</i>		
<i>Satyrum,</i>	—	— Lizard-flower.
<i>Serapias,</i>	—	— Helleborine, or bastard-hellebore.

Habit and Structure of the Plants of this Order.

The **ROOTS** of many of these plants are composed of one or more fleshy tubercles, attached to the lower part of the stem, and sending forth fibres from the top. Those of orchis bear an obvious resemblance to the scrotum in animals; from which circumstance the genus has derived its name.

The **LEAVES** are of a moderate size, inscribed with a number of longitudinal nerves or ribs, and without any footstalk. At their origin, they form, round the stalk, a kind of

of sheath, which is long, entire, cylindrical, but not furnished, like the grasses, and some other plants, with a crown at top. This sheath is sometimes wanting in the leaves that are placed towards the top of the stalk. In some species of bird's-nest, the leaves prove abortive; the sheaths which surround the stalk appearing like so many scales.

The FLOWERS are hermaphrodite, and placed at the summit of the stalk, either in a spike, as in ladies slipper, bee-flower, orchis, satyrium, *limodorum* and *arethusa*; or in a panicle, that is, a loose, diffused spike, as in vanelloe. Each flower is accompanied with a leaf that is smaller than the other leaves, and forms no sort of sheath round the stalk.

The CALYX in this order is that sort termed by Linnæus a *spatha* or sheath, that, bursting open, protrudes a head or cluster of flowers termed the *spadix*, which have no *perianthium*, or proper flower-cup.

The PETALS are five in number, and very irregular. The two innermost frequently approach and form the figure of a helmet. The three outermost are larger, and nearly equal.

The NECTARIUM in this order is remarkably conspicuous, yet so different in the different genera, that Linnæus has employed it for his principal character or mark of distinction, instead of the root, which had chiefly engaged the attention of former botanists. It has the appearance of a sixth petal, and constitutes the lower lip of the helmet. In some species of *ophrys* it is shaped like a bee; whence the English title of bee-flower, which has been given to that genus. In *limodorum* it consists of one piece, which is hollow, of the length of the petals, and placed within them. In *cyripedium* the appearance in question is situated between the petals, and resembles a wooden shoe or slipper; from which circumstance it has derived both its scientific and English name. In orchis and satyrium, the *nectarium* consists of two lips; the upper erect and very short, the lower larger, hanging, and terminated behind by a tube, which, in the former, resembles a horn, in the latter, the *scrotum* in animals. In *arethusa* it is placed in the bottom of the flower, and consists

of one piece that is divided into two lips ; the lowermost of which is broad, wrinkled within, turned backwards, hangs down, and is of the length of the petals ; the upper slender, like a line of elegant texture, and incorporated with the style. In vanelloe, it is shaped like a top, and placed at the back of the petals. Lastly, in helleborine, it is placed in the middle of the flower, and in most of the species resembles the embowelled body of a fly.

The FILAMENTS, or lower part of the stamina, are always two in number, very short, and placed upon the *pistillum*, or female organ ; from which singular circumstance, the plants in question are arranged under the class *Gynandria* in the Sexual Method. *Vide GYNANDRIA.*

The ANTHERS or summits are erect, and generally covered by the upper lip of the *nectarium*.

The SEED-BUD is either oblong or pillar-shaped, twisted like a screw, and universally placed below the receptacle of the flower.

The STYLE is single, very short, and forms one substance with the inner margin of the *nectarium*, so that both style and stigma are with difficulty to be perceived. This last is commonly filled with a viscous sweet substance like honey.

The SEED-VESSEL is generally a capsule with one cavity and three valves or openings, which are commonly keel-shaped, and open on the angular sides, being joined both at bottom and top. In vanelloe, the seed-vessel is a long, cylindrical, unctuous, fleshy pod. What chiefly distinguishes it from the capsular fruit of the other genera is, its wanting the keel-shaped ribs or valves, so conspicuous in the other plants of this order.

The seeds are numerous, very small like saw-dust, and attached, without foot-stalks, to a slender receptacle, or rib, which extends itself length-wise in the middle of each inclosure. In vanelloe, they are almost round, shining, and of a black colour. In the other genera, they are rather flat, of a yellow colour, and fringed on the border with a longitudinal membrane, or wing.

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The plants of this order are celebrated as mighty provocatives to venery. This restorative quality, which is chiefly possessed by the roots, is most predominant in the vanelloe of the Americans, the salep of the Eastern countries, and the orchis and satyrium of the Europeans. The tubercles of the roots have an acrid quality, which is destroyed by drying, or moistening them in warm water.

Vanelloes are the pods of a twining parasitic genus of plants, which grow plentifully on trees, both in the East and West Indies. These pods resemble our kidney beans, being about half a foot long, and containing a number of very small seeds. When ripe and dry, the inhabitants of Mexico and St. Domingo, whence these pods are imported into Europe in greatest abundance, gather them, and, having rubbed them with oil, lest they should harden and break, form them into bundles, or bags of different sizes, containing, some fifty, some a hundred, some a hundred and fifty pods. The Indians call the plant *tlilxochitl*, and the pod *maxacochitl*. Hernandez says, it is useful in suppressions, warms and fortifies the stomach, facilitates digestion, and dissipates wind. Vanelloe has a very agreeable taste and smell. It is esteemed an excellent cordial, and enters into the composition of chocolate, which, indeed, is its principal use with us. A black fragrant balsam is procured from the same pods; but this is very rarely brought to Europe. The name vanilla, signifying a sheath, was given to this plant by the Spaniards, from the figure of its pods.

The flowers of the different species of orchis and *ophrys* are remarkably various and singular in their shape; resembling sometimes a naked boy, sometimes a gnat, a butterfly, a bee, a pigeon, an ape, a parrot, a lizard, or a fly. These resemblances have given names to the species in question. The beard or *nectarium* of the bee-flower, is a large fat leaf, beautifully representing a drone or bee of a sooty colour, and which, when turned to the light, seems variegated with three bright yellow circular lines, with rust-coloured spaces between them. The *nectarium* of humble-bee saty-
rion,

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tion, the *testiculus sphægodes hirsuto flore* of Ray, is remarkable for two upright lines, of a livid colour, and a transverse one of the same colour, representing a capital H. The flowers of many of the orchis-tribe are beautifully spotted.

ORDO, an order; the first subdivision of a class in the Sexual Method, corresponding to the term *sectio*, in Tournefort. Such a division, by parcelling out the genera of any class into several distinct lots, gives perspicuity to the method, and facility to its distinctions.

The orders in Tournefort's System are chiefly founded upon the fruit: those of the Sexual Method, on the number of styles or female organs. A particular enumeration of the latter is subjoined to their respective classes, whither the reader is referred for information on this subject.

I would at present, only remark one circumstance in which Linnæus's orders are preferable to those of Tournefort. The latter botanist expresses this subdivision by a circumlocution, which commonly includes a repetition of the abridged clavis of his System. On the other hand, Linnæus's orders are always expressed by a single term, which, like the names of the classes, is of Greek etymology, and is significative of the character of the order to which it is applied. It is needless to subjoin, that the names of these orders are often the same in different classes, because the same idea predominates in their institution. If the same character could, in like manner, be employed for distinguishing all the orders of each class, the system would, in that point, at least, have attained perfection. The classes in the Sexual System are much more uniform than the orders. The latter, therefore, as scientific divisions, are greatly inferior to the former.

ORDO, a term of Tournefort, corresponding to the *classis* or highest division of Linnæus. *Vide CLASSIS.*

ORGYA, a term of Measure. *Vide MENSURA.*

OVARIUM (*ovum*, an egg) the ovary; a name, by which botanists, who are fond of assimilating the animal and vegetable kingdoms, have distinguished the *germen* or seed-bud, as containing the rudiments of the future seed.

PALATUM

PALATUM *corollæ*, the palate of the flower; by this name Linnæus characterizes any prominence or gibbosity in the jaws (*faux*) of the *corolla*.

PALEÆ, thin, membranaceous, chaffy plates springing out of a common receptacle, and intended as lines of partition between the small partial florets of compound and aggregate flowers.

PALEACEUS *flos*, a term of Ray, expressive of such flowers as produce no fruit. It corresponds to the *masculus flos* of Linnæus, the *sterilis* of Tournefort, the *abortiens* of other botanists.

PALMÆ, palms. Under this name Linnæus has arranged several genera, which, although capable of a place in separate classes of his system, he has chosen rather, on account of their singular structure, to place apart, in an appendix to the work.

The same plants constitute one of the seven families or tribes into which all vegetables are distributed by Linnæus in his *Philosophia Botanica*. They are defined to be plants with simple stems, which, at their summit, bear leaves resembling those of the ferns, being a composition of a leaf and a branch; and whose flowers and fruit are produced on that particular receptacle, or seat, called a *spadix*, protruded from a common calyx, in form of a sheath or scabbard, termed by Linnæus, *spatha*.

It is to be observed, however, that the terms *spatha* and *spadix*, though originally applied by Theophrastus to palms only, are used with much greater latitude by modern botanists, and applied to narcissus, snow-drop, orchis, satyrium, arum, dracontium, calla, pothos, sea-daffodil, and many other plants, whose flower-stalks come out of a sheath.

PALMÆ is likewise the name of the first order in Linnæus's Fragments of a Natural Method, consisting of the following genera, the three last of which, although not ranged with the palms in the appendix to his Artificial System, are placed

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placed with them, on account of their alleged conformity in point of habit, in his Natural Method.

Linnæan Genera.			English Names.
α	<i>Areca</i> ,	—	— The faufel-nut.
	<i>Baraffus</i> ,	—	— Malabar-palm, called ampana and carim-pana.
	<i>Caryota</i> ,	—	— Palm with doubly-winged leaves, called schunda-pana.
	<i>Chamærops</i> ,	—	— Lesser, or dwarf-palm, palmetto, thatch.
	<i>Cocos</i> ,	—	— Cocoa nut tree.
	<i>Corypha</i> ,	—	— Mountain-palm with largest leaves, called codda-pana.
	<i>Cycas</i> ,	—	— Todda-pana.
	<i>Elais</i> .		
	<i>Elate</i> ,	—	— Wild Malabar-palm, called Katou-Indel.
	<i>Phœnix</i> ,	—	— Date-tree.
	<i>Zamia</i> .		
β	<i>Hydrocharis</i> ,	—	— Frog's-bit.
	<i>Stratiotes</i> ,	—	— Water-foldier.
	<i>Vallisneria</i> .		

Habit and Structure of the Plants of this Order.

The plants of this order are perennial, and mostly of the shrub and tree kind. The stem is in height, from two to a hundred feet and upwards.

The ROOTS form a mass of fibres, which are commonly simple, that is, without any ramifications. In frog's-bit, the roots are terminated by a small cup, of a conic form, which covers them like an extinguisher, as in duck's-meat.

The STEM is generally simple, cylindrical, and composed of strong longitudinal fibres.

The LEAVES, which are a composition of a leaf and a branch, termed by Linnæus *frondes*, are of different forms ;
being

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being sometimes shaped like an umbrella or fan; sometimes singly or doubly-winged; the small or partial leaves, which are often three feet in length, being ranged alternately. The branches or principal leaves are six, eight, ten and twelve feet long; the length varying according to the age and size of the plant.

They are covered at first with a brown thick dust, like those of the ferns. The base of the leaves frequently embraces the greater part of the stem. *Schunda-pana* is the only genus of this order yet known, which bears doubly-winged leaves.

The FLOWERS are male and female upon the same or different roots, except in water-soldier, which bears hermaphrodite flowers only, and palmetto, in which the flowers are hermaphrodite and male upon distinct roots. In *vallisneria* and frog's-bit too, the flowers are not so properly male and female upon different roots, as barren hermaphrodites; a small seed-bud being discovered in those called the male flowers, and the remains of stamina in the female. Abortive flowers of the same kind are frequently observed in *vallisneria* upon the same root.

The flowers are all disposed in a panicle or diffused spike, except in the three last genera, in which they proceed singly from the angles of the leaves. In *todda-pana*, says M. Adanson, the flowers grow upon the indentments of the leaves, whose divisions form a kind of panicle.

The COMMON CALYX in this order is that sort termed a *spatha* or sheath, and has either one valve or opening, as in date tree, and cocoa-nut; or two, as in faufel-nut, and wild Malabar-palm. The *spudix*, or head of flowers protruded from the sheath, is generally branched. Each flower is commonly furnished with a *perianthium*, or proper flower-cup, consisting of three leaves or divisions that are small and permanent.

The PETALS are three in number, of a substance like leather, and permanent like the leaves of the calyx. The flowers of *zamia* have no petals.

The STAMINA are in number from two to twenty and upwards,

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wards, and cohere slightly at the base. In frog's-bit they appear like a pillar in the centre of the flower.

The SEED-BUDS are from one to three in number, placed in the middle of the flower, and support a like number of styles, which are very short. In frog's-bit, *vallisneria*, and water-foldier, the seed-bud is placed under the receptacle of the flower.

The SEED VESSEL is generally a pulpy fruit of the berry or cherry kind, containing one cell filled with fibrous flesh, and covered with a skin, which is of a substance like leather.

The SEEDS are in number from one to three in each pulpy fruit, of a hard bony substance, round or oval, and attached by their base to the bottom of the fruit.

These plants, particularly the seeds, are astringent, and of efficacy in dysenteries.

The date-tree, the *phœnix dactylifera* of Linnæus, is a native of Africa, and the eastern countries, where it grows to fifty, sixty, and one hundred feet high. The trunk is round, upright, and studded with protuberances, which are the vestiges of the decayed leaves. From the top issues forth a cluster of leaves or branches, eight or nine feet long, extending all round like an umbrella, and bending a little towards the earth. The bottom part produces a number of stalks like those of the middle, but seldom shooting so high as four or five feet. These stalks, says Adanson, diffuse the tree very considerably; so that, wherever it naturally grows in forests, it is extremely difficult to open a passage through its prickly leaves. The flowers are male and female upon different roots. The dates, which are the produce of the female plant, grow in large spiral clusters, each being about the bigness and shape of a middling olive, and containing within the pulp, which is of a yellow colour, and agreeable taste, a round, strong, hard nut or stone, of an ash-colour, marked with a deep furrow running lengthwise. Of the fresh dates and sugar, says Hasselquist, the Egyptians make a conserve, which has a very pleasant taste. The kernels or stones, though hard as horn, they grind on hand-

hand-mills, and in default of better food, give to their camels. Of the leaves are made baskets, or bags, which are much used in Turkey on journies, and for other æconomical uses. In Egypt they are used as fly-flaps, for driving away the numerous insects, which prove so troublesome in hot countries; and Rauwolff relates, that of the fibres of the leaves, and covering of the fruit, are spun ropes, of pretty large dimensions and considerable strength. The hard boughs are used for fences, and other purposes of husbandry; the principal stem for building; in fine, no part of this curious tree wants its use. The fruit, before it is ripe, is somewhat astringent, but when thoroughly mature, is of the nature of the fig. The Sencgal dates are shorter than those of Egypt, but much thicker in the pulp, which is said to have a sugary agreeable taste, superior to that of the best dates of the Levant.

Palmetto, that is, little palm, called, by the Americans, thatch, from the use to which the leaves are applied, is a native of Africa and the West-Indies, and seldom grows so high as the other palms. M. Adanson, however, describes, under the name of palmetto, a species of palm, which grows naturally at Senegal, whose trunk rises from fifty to sixty feet in height. The negroes call this palm, *ronn*, which name the French have changed to *rondier*. From the upper end of the trunk issues a bundle of leaves, which, in turning off, form a round head; each leaf represents a fan of five or six feet in expansion, supported by a tail of the same length. Of these trees, some produce male flowers, which are consequently barren; others are female, and loaded with fruit, which succeed each other uninterruptedly almost the whole year round. The fruit of the large palmettos, M. Adanson affirms to be of the bigness of an ordinary melon, but rounder; it is enveloped in two skins as tough as leather, and thick as strong parchment; within, the fruit is yellowish, and full of filaments, fastened to three large kernels in the middle. The negroes are very fond of this fruit, which, when baked under the ashes, is said to taste like a quince.

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The fruit of the *areca*, or faufel nut, refembles a nutmeg in texture, and, when ripe, is infpid and aftringent. Its inffipated juice is fupposed to be the cachou, or, as it is improperly termed, Japan-earth of the fhops.

Palm-oil tree, or oily palm, is a native of Africa, and riles about fifty feet high; from the fruit is drawn an oil, of which the negroes are remarkably fond. They generally roaft the fruit in the embers, and then fuek the fine fweet oil, which is contained in the many interffices of its yellow hufky tegument. With this oil they likewife anoint their bodies, to prevent a too plentiful perfpiration, as well as to fupple and relax their ffiffened nerves. Being thus anointed, their fkins appear fleep and fhining. Within the outward covering is the nut, which contains a white kernel, in tafte fomewhat refembling that of the cocoa-nut, but not fo agreeable. Thefe nuts, when bored and emptied of their kernels, are ftrung by the negroes, as ornaments about their neeks. From the body of this and the cocoa-nut tree is extracted a liquor, which, when fermented, has an intoxicating quality, and is known by the name of palm wine.

The cocoa-nut tree is fupposed to be a native of the Maldivé Iflands, but is cultivated in both Indies, particularly in South America, and the Weft India Iflands, where it fupplies the inhabitants with many of the common neceffaries of life. This tree frequently riles ffty feet high. The body of the trunk, which generally leans to one fide, occafioned, as is fupposed, by the great weight of nuts which it fuffains when young, is the exact fhape of an apothecary's large iron peffle, being of an equal thicknefs at top and bottom, but fomewhat fmaller in the middle; its colour is of a pale brown throughout, and the bark fmooth. The leaves, or branches, often fifteen feet long, are about twenty-eight in number, winged, of a yellow colour, ftraight and tapering. The pinnæ, or partial leaves, are green, often three feet long next the trunk, but diminifhing in length toward the extremity of the branches. The branches are faffened at bottom by brown ffirngy threads, about the fize of ordinary packthread, that grow out of them, and are interwoven like a web. The nuts hang at the top of the trunk, in clufters,
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of a dozen each. Each nut, next the stem, has three holes closely stopped; one of them being wider and more easily penetrated than the rest. When the kernel begins to grow, it incrusts the inside of the nut in a bluish jelly-like substance. As this grows harder, the inclosed liquid, distilled into the nut from the roots, becomes somewhat acid; and the kernel itself, as the nut ripens, becomes still more solid; and, at length, lines the whole inside of the nut for above a quarter of an inch thick, being as white as snow, and of the flavour of an almond. The quantity of liquor in a full grown nut is frequently a pint and upwards. The husky tegument of the nut consists of strong, tough, stringy filaments, which, when removed from the fruit, resemble coarse oakum; and might, perhaps, be conveniently enough used as such. The shells of these nuts being tipped with silver, are frequently used for drinking-bowls; the bark of the tree may be wrought into cordage, and the leaves into baskets, brooms, hammocks in form of nets, mats, sacks, and other useful utensils. The liquor contained in the shell is a most cooling wholesome beverage in those sultry climates, and the white kernel a most agreeable food.

In the East Indies, during the prodigious rains and tempestuous seas on the coast of Malabar, which generally continue from the end of May till the beginning of September, the Banian Indians endeavour to appease the incensed ocean, by offering a number of gilded cocoa-nuts to its enraged waves; an anniversary ceremony of which the young Indians are remarkably fond, as it gives them an opportunity of shewing their dexterity in swimming, to recover the nuts which have been thrown into the sea. The cocoa-nut of the Maldivé islands is esteemed by the inhabitants a very powerful antidote against the bites of serpents, and other poisons.

The cabbage-tree, or mountain palm, the *palma altissima non spinosa* of Sloane, is a native of the West Indies, where it is said to rise to the height of one hundred and fifty, and two hundred feet. It is, by some authors, called the palmetto royal; and well, says Hughes, in his Natural History

of Barbadoes, may it be called royal, since neither the tall cedars of Lebanon, nor any of the trees of the forest are equal to it in height, beauty, or proportion. It is generally as straight as an arrow: near the earth it is about seven feet in circumference, but tapers as it ascends. The bark is of an ash colour till within twenty-five or thirty feet of the extremity of the tree, when it alters at once to a deep sea-green, which continues to the top. Upon removing the large leaves or branches which surround the top of the trunk, a little way above the beginning of the green bark just mentioned, what is called the cabbage is discovered lying in many thin, snow-white, brittle flakes, in taste resembling an almond, but sweeter. This substance, which cannot be procured without destroying the tree, is boiled, and eaten with mutton, by the inhabitants of the West-Indies, in the same manner as turnips and cabbage are with us; it is likewise pickled, and sent to Europe, where it is esteemed an exquisite delicacy.

In the pith of the trunk of the cabbage-palms, when felled, there breeds a kind of worms or grubs which are eaten, and esteemed a great delicacy by the inhabitants of Martinico, and of the other French West-India islands. These worms, says Father Labat, are about two inches long, and of the thickness of one's finger; the head is black, and attached to the body without any distinction of neck. Their preparation for the table is as follows: they are strung on wooden skewers before a fire, and, as soon as heated, are rubbed over with raspings of crust, salt, pepper, and nutmeg; this powder absorbs all the fat, which, during the cookery, would otherwise escape; when properly roasted they are served up with orange, or citron sauce. These worms being exposed for some time to the sun are said to yield an oil which is of great efficacy in the piles. The oil in question, says Labat, is never to be heated before its application to the part affected; as repeated experiments have evinced that its spirit is totally dissipated by the fire.

From the pith of a species of palm that grows naturally in Japan, is prepared the substance, well known in the shops
by

by the name of sago. The pith is taken out, and, after being pounded in large mortars, is mixed with water. The liquor is then strained, and the fæculæ formed into cakes, which the Japanese eat as bread, in default of rice: part of the same substance they granulate and dry, and send into Europe by the name of sago; it is esteemed highly nourishing and restorative.

From the dragon-tree, a palm which grows naturally in the Cape-Verd Islands, and has leaves like those of the yucca or Adam's needle, flows by incision, a red gummy juice, commonly known by the name of dragon's blood, and reckoned vulnerary and astringent.

A species of water-soldier, or marsh-aloe, is the surprising plant which is said to move in the waters of the Nile, seeking for nutrition in the same manner as animals. The fact is, that the plant produces tufts of leaves, at a very great distance from one another, and supported by a stem, which, after floating on the water, loses itself insensibly in the earth, in much the same manner as the potamogetons, the menyantes, and even the leaves of the water-lily.

PANICULA, (diminutive from *panus*—Festus; the woof wound on the quill in the shuttle) a mode of flowering, in which, according to Linnæus, the fructifications are dispersed upon footstalks variously subdivided. It is, in fact, a sort of branching or diffused spike, composed of a number of small spikes that are attached along a common footstalk. The term is exemplified in oats, panic-grass, and many other plants.

When the partial foot-stalks diverge, and the fructifications hang loose, the panicle is properly said to be diffuse, (*panicula diffusa*) as in *poa aquatica*, and *alpina*: when the foot-stalks approach, the panicle becomes straight and narrow, (*panicula coarctata*) as in *festuca ovina* and *aira cærulea*.

PAPILIONACEUS *flos*; (*papilio*, a butterfly) a butterfly shaped flower. *Vide* COROLLA.

PAPILIONACEI, the name of two classes in Tournefort's and Pontedera's methods, consisting of herbs and trees with butterfly-shaped flowers. These plants, which are the legu-

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minoræ of Ray, and form a true natural assemblage, constitute the thirty-second order in Linnæus's Fragments of a Natural Method under the same title, which indeed is expressive of their most striking character.

List of the Genera contained in this Natural Order.

SECTION I.

Butterfly-shaped Flowers, having the Filaments of the Stamina distinct.

Linnæan Genera.	English Names.
<i>Anagyris,</i> — —	Stinking bean trefoil.
<i>Sophora.</i>	

SECTION II.

Butterfly-shaped Flowers with One Set of united Filaments.

<i>Abrus,</i> — —	Wild liquorice.
<i>Amorpha,</i> — —	Bastard Indigo.
<i>Anthyllis,</i> — —	Kidney-vetch, or ladies finger.
<i>Arachis,</i> — —	Earth or ground-nut.
<i>Aspalathus,</i> — —	African broom.
<i>Borbonia.</i>	
<i>Crotalaria,</i> — —	Rattle-wort.
<i>Ebenus,</i> — —	Ebony of Crete.
<i>Erythrina,</i> — —	Coral tree.
<i>Genista,</i> — —	Single-seeded broom, Dyer's broom.
<i>Lupinus,</i> — —	Lupine.
<i>Nissolia.</i>	
<i>Ononis,</i> — —	Anonis, or rest-harrow.
<i>Piscidia,</i> — —	Dog-wood tree.
<i>Pterocarpus.</i>	
<i>Spartium,</i> — —	Broom.
<i>Ulex,</i> — —	Furze, whins.

SECTION

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SECTION III.

Butterfly-shaped Flowers with two Sets of united Filaments.

<i>Aeschynomene,</i>	—	—	Bastard-sensitive-plant.
<i>Astragalus,</i>	—	—	Liquorice vetch, or milk vetch, goat's-thorn.
<i>Biserrula.</i>			
<i>Cicer,</i>	—	—	Chich pea.
<i>Clitoria.</i>			
<i>Colutea,</i>	—	—	Bladder-fenna.
<i>Coronilla,</i>	—	—	Jointed-podded colutea.
<i>Cytisus,</i>	—	—	Laburnum, base tree-trefoil.
<i>Dolichos.</i>			
<i>Ervum,</i>	—	—	Lentil.
<i>Galega,</i>	—	—	Goat's-rue.
<i>Geoffraea.</i>			
<i>Glycine,</i>	—	—	Carolina kidney-bean tree.
<i>Glycyrrhiza,</i>	—	—	Liquorice.
<i>Hedysarum,</i>	—	—	French honey-suckle.
<i>Hippocrepis,</i>	—	—	Horse-shoe vetch.
<i>Indigofera,</i>	—	—	Indigo.
<i>Lathyrus,</i>	—	—	Chichling vetch, everlasting pea.
<i>Lotus,</i>	—	—	Bird's-foot trefoil.
<i>Medicago,</i>	—	—	Medic, snail and moon-trefoil, Lucern.
<i>Ornithopus,</i>	—	—	Bird's-foot.
<i>Orobus,</i>	—	—	Bitter vetch.
<i>Phaca,</i>	—	—	Bastard milk-vetch.
<i>Phaseolus,</i>	—	—	Kidney-bean, or French- bean.
<i>Pisum,</i>	—	—	Pea.
<i>Psoralea.</i>			
<i>Robinia,</i>	—	—	Falſe acacia.
<i>Scorpiurus,</i>	—	—	Caterpillars.
<i>Trifolium,</i>	—	—	Trefoil.
<i>Trigonella,</i>	—	—	Fenugreek.
<i>Vicia,</i>	—	—	Vetch, bean.

Habit and Structure of the Plants of this Order.

These plants, otherwise called leguminous, from the seed-vessel, which is that sort termed a *legumen*, are very different both in size and duration; some of them being herbaceous, and those either annual or perennial; others, woody vegetables of the shrub and tree kind, a few of which rise to the height of seventy feet, and upwards. The herbaceous plants of this order generally climb, for being weak, and, as it were, helpless of themselves, indulgent Nature has either provided them with tendrils, and even sharp-pointed hooks at their extremities, to fasten upon the neighbouring trees or rocks, or endued the stalks with a faculty of twisting themselves, for the purpose of support, around the bodies in their neighbourhood.

The pea, vetch, and kidney-bean, afford familiar examples of the appearances in question. The shrubs and trees of this natural family are mostly armed with strong spines.

The ROOTS are very long, and furnished with fibres: some genera have fleshy tubercles, placed at proper intervals along the fibres.

The STEMS are cylindric, as are likewise the young branches, which are placed alternately: those which climb twist themselves from right to left, in a direction opposite to the apparent diurnal motion of the sun.

The bark of the large trees is extremely thick, and wrinkled, so as to resemble a net with long meshes; the wood is very hard in the middle, and commonly coloured, or veined; the alburnum is less hard, and generally of a yellow colour.

The BUDS are hemispherical, without scales, and proceed from the branches horizontally, a little above the angle which they form with the leaves.

The LEAVES are alternate, and of different forms, being either simple, finger-shaped, or winged. This last form is very common. The lobes or lesser leaves are entire, and sometimes placed in pairs, as in wild liquorice, vetch, lathyrus, and ground nut; but most commonly, the winged-leaf

is terminated by an odd lobe; as in colutea, liquorice, goat's rue, fenugreek, ladies finger, medicago, astragalus, indigo, and coronilla. The winged or pinnated leaves of this order have a daily or periodical motion depending upon the progress of the sun in his diurnal course. See the article MORUS, where the motion alluded to is particularly explained.

The common foot-stalk of the winged and other compound leaves is marked on the upper surface with a cavity, or furrow, which runs through its whole length. In the vetch, lathyrus, and some others, the foot-stalk is terminated by a pretty long branching tendril, instead of the odd lobe, which in these plants is wanting; although, from the alternate disposition of the lesser leaves along the foot-stalk, an abrupt termination does not appear natural.

Aphaca, a species of lathyrus, has no leaves; that want being supplied by a simple tendril, which proceeds at each joint from the stem, betwixt two large *stipulae* that are opposite, and united, so as to form the appearance of a single leaf penetrated by the stalk. The surface of the leaves of some species of psoralea is covered with pellucid glandular knobs, which, when held up to the light, appear like so many minute points, or holes: the calyx is fludded in like manner.

The FLOWERS are hermaphrodite, and proceed either from the wings of the leaves, as in furze, goat's-rue, liquorice, lupine, colutea, kidney-bean, goat's thorn, a species of astragalus, *biserrula*, medicago, and glycine; or from the extremity of the branches, as in ebony of Crete, false acacia, trefoil, lotus, African broom, *cratalaria*, and coral-tree. In a species of goat's rue of Senegal, mentioned by M. Adanson, the spike of flowers proceeds not from the angle of the leaves, but from the opposite side of the branches, as in the rough-leaved plants.

The CALYX is a *perianthium* of one leaf, bell-shaped, bunching out at the bottom, and cut on its brim or margin into five irregular divisions, or teeth, the lowermost of which, being the odd one, is longer than the rest: the other four stand in pairs, of which the uppermost is shortest, and

stands farthest asunder. The bottom of the calyx is moistened with a sweet liquor like honey, so may be deemed the *nectarium* of these plants.

Some species of kidney-bean have a second calyx without the other, that is round, and consists of two leaves.

The PETALS are four or five in number, very irregular, and from their figure and position, bear an obvious resemblance, in most of the genera, to a butterfly expanding its wings for flight. These petals have been characterized by distinct names: the upper one, which is commonly the largest, is termed the standard, (*vexillum*); the two side petals, the wings, (*alæ*); and the lowermost, which is generally united at top, and divided at bottom, the keel, (*carina*). *Vide* COROLLA.

In bastard indigo, the flower is furnished with the upper petal, or standard, only; a circumstance which essentially distinguishes the genus in question. In kidney-bean, the keel, involving the parts of generation, is spirally twisted, in a direction opposite to the sun; by which character this genus is distinguished from *dolichos*, to which it is otherwise very nearly allied. In Ethiopian bladder-senna, the standard is shorter than the keel; the wings much shorter than the standard. Some species of trefoil have only one petal, the standard, wings, and keel, being conjoined. In fenugreek, the keel is very small, and the standard and wings are so situated, as to form the appearance of a regular flower with three petals; whence the name *trigonella*, that is, three-cornered flower, which has been given to this genus. Ebony of Crete has no wings to its flowers. In coral-tree, both wings and keel are very short, so that the butterfly-shape is not very conspicuous in the flowers.

The flowers fall off very early in most of these plants, except in the trefoils with one petal, and some species of ladies finger, in which they are permanent. That they may sometimes, though very rarely, be rendered double by culture, rusby, or Spanish broom, the *spartium junceum* of Linnæus, is sufficient evidence.

The STAMINA are generally ten in number. These
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are either totally distinct, as in plants of the first section, or united by the filaments into one or two bundles involving the seed-bud, as in those of the second and third. In the latter case, where there are two sets of united filaments, one of the sets is composed of nine stamina, which are united into a crooked cylinder that is cleft on one side through its whole length. Along this cleft lies the tenth filament, or stamen, which constitutes the second set, and is often so closely attached to the large bundle, that it cannot be separated without some difficulty.

Upon the union of the stamina just mentioned is founded the systematic or artificial character of the class *Diadelphia* in the Sexual Method: to which class, all the plants of this order, except those of the first section, are referred. Yet with what propriety can the plants of the second section, which confessedly have but one set of united filaments, or, at least, whose filaments are all connected at the base, be arranged under a class whose characteristic, as expressed in the title, is to have two distinct sets, or *brotherhoods*, (so the term imports) of stamina so united? Their structure would much more naturally determine them to a place in the immediately preceding class, *Monadelphia*, which, indeed, is expressive of the very circumstance in their structure alluded to. The plants even of the third section, though they come nearer to the description expressed in the title, are very rarely to be discovered, or distinguished by that circumstance. In short, the more accurately we examine the structure of the butterfly-shaped flowers, the more reason shall we find to be dissatisfied with the arbitrary manner in which Linnæus has arranged them, and to prefer the more natural and easy arrangements from the figure of the flower, and structure of the fruit.

The anthers are small, round, marked with four longitudinal furrows, and slightly attached to the filaments. In lupine, the *anthers* are alternately round and oblong.

The SEED-BUD is single, placed upon the receptacle of the flower, oblong, cylindrical, slightly compressed, of the length of the cylinder of the united stamina by which it is involved;

involved; and sometimes, as in coral-tree, elevated by a slender foot-stalk, which issues from the centre of the calyx.

The **STYLE** is single, slender, and generally crooked. In pea, the style is hairy, three-cornered, and keel-shaped above; by which last circumstance chiefly, that genus is distinguished from lathyrus, in which the style is plain.

The **STIGMA**, or summit of the style, is generally covered with a beautiful down, and placed immediately under the *anthers*, or tops of the stamina.

The **SEED-VESSEL** in this order, is that sort of pod, termed a *legumen*, which is of an oblong figure, more or less compressed, with two valves, and one, two, or more cavities; these cavities are often separated, when ripe, by a sort of joints, which are conspicuous in the pods of coronilla, French honey-suckle, horse-shoe vetch, bird's foot, bastard-sensitive-plant, and scorpiurus: in the latter, the pods rarely open of themselves; but as they are more easily separated cross-wise by the joints than length-wise by the sutures, it would seem that they have been naturally destined to split in that manner. In *pterocarpus* the pod is compressed, of a leafy substance, marked with veins on the sides, and woody within; in lupine, and ground-nut, it is of a substance like leather; in ladies finger it is roundish, and placed within the permanent calyx; in borbonia it is pointed, and terminated with a spine; in furze, it is turgid, and almost surrounded by the calyx; in anonis it is of the figure of a rhombus; in bladder-senna it is large, inflated like a bladder, membranaceous, transparent, and opens at the base of the upper suture; in *hippocrepis* it is shaped like a horse-shoe; in *hedyfarum clypeatum* it is round like a shield; in medic, or lucern, it resembles a snail's shell, or ram's horn.

The **SEEDS** are generally few in number, round, smooth, and fleshy. Jointed pods have generally a single seed in each articulation. The seeds are all fastened along one suture, and not alternately to both, as in the other species of pod termed *siliqua*.

The plants of this family are, in general, mucilaginous.

From

From the inner bark of most of them flows, either naturally, or by incision, a clammy liquor, which dries and hardens like gum; the juice of some others, as liquorice, and glycine, is sweet like sugar.

Some of these plants are bitter to the taste, purgative, or emetic, and even mortal. A species of eastern astragalus with goat's rue leaves, is said to be remarkably caustic, and to burn the tongue excessively when chewed. In general, however, these plants are soft and clammy.

Common dyer's broom has the foetid nauseous smell of the elder-tree.

With respect to their virtues, the plants of this order are highly emollient; some of them too are vulnerary and astringent; the root of anonis, or rest-harrow, is diuretic.

The leaves of these plants, particularly those of trefoil, lucern, vetch, lotus, lathyrus, French honey-suckle or faint-foin, and fenugreek, afford excellent pasture for cattle; the seeds, which are mealy and flatulent, are used in food both for men, and quadrupeds of the tame kind. The chief of the esculent seeds are those of the pea, bean, vetch, kidney-bean, chick-pea, and lentil. Externally these plants are applied to inflammatory tumours which tend to suppuration. Dyer's broom is said to be of use in drop-sies. From the young shoots of *amorpha*, and a species of *sophora*, the inhabitants of North America formerly prepared a coarse sort of Indigo, before the introduction of the true-Indigo plant; for which reason the title of bastard-Indigo is given to the former genus.

The branches of *genista tinctoria* are used by dyers to give a yellow colour, whence the scientific and English names of this species.

The seeds of white lupine are sometimes used in medicine; they are bitter and disagreeable to the taste, but open, resolve, and cleanse. An ointment made of the powder of the seeds, juice of lemons, and allum, is esteemed an excellent cosmetic.

Prickly anonis, or rest-harrow, overspreads the eastern countries, particularly Egypt and Palestine, in such abundance, that Dr. Hasselquist concludes it to be one of those
pernicious

pernicious cumbersome plants, which are so frequently mentioned in Scripture by the name of thorns.

Purple rest-harrow without thorns, the *ononis mitis* of Linnæus, which grows plentifully on the borders of fields and barren pastures in England, emits a viscid kind of moisture that smells rank like a goat.

Dogwood-tree, the *piscidia erythrina* of Linnæus, which grows plentifully in the West-Indies, is chiefly noted for the quality said to be possessed by its bark, of intoxicating fish, which, by that means, become an easy prey to those who employ this stratagem against them. When any number of gentlemen have an inclination to divert themselves with fishing, or more properly speaking, with fish-hunting, they send each of them a negro slave to the woods, in order to fetch some of the bark of the dogwood-tree. This bark is next morning pounded very small with stones, put into old sacks, carried into rocky parts of the sea, steeped till thoroughly soaked with salt-water, and then well squeezed by the negroes to express the juice, which immediately colours the sea with a reddish hue, and being of a poisonous nature will, in an hour's time, make the fishes, such as groopers, rock-fish, old wives, welchmen, &c. so intoxicated, as to swim on the surface of the water, quite heedless of the danger. The gentlemen then send in their negroes, who pursue, both swimming and diving, the poor inebriated fishes, till they catch them with their hands; their masters, mean time, standing by, on high rocks, to see the pastime.

It is remarkable, that though this poison kills millions of the small fry, it has never been known to impart any bad quality to the fish, which have been caught in consequence of the intoxication.

The wood of this tree, although pretty hard, is only fit for fuel; and even for this purpose, the negroes very seldom, if ever, employ it, on account of its singular quality just mentioned. The bark is rough, brown, and thick; the tree sends forth a considerable number of branches, and is well clothed with leaves, which resemble those of the pea,
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are thick, cottony, and of a deep green. The bark used for the above-mentioned purpose is chiefly that of the roots. See Labat, *Voyage aux Isles de l'Amerique*; and Smith's *Natural History of Nevis*.

The branches or stalks of common broom being dried in the sun, and treated like hemp, produce threads which may be spun, and worked into a coarse linen cloth. In the country they are made into besoms, thence denominated brooms; from this its familiar use, Linnæus has derived the trivial name of this species, and called it *spartium scoparium*, sweeping-broom.

The wood of a West-Indian species of broom, the *spartium arborescens* of Miller, frequently known by the name of American ebony, is of a fine greenish-brown colour, hard, durable, and admits of an exceeding good polish.

M. Adanson, in his *Voyage to Senegal*, mentions a new species of bastard-sensitive-plant, which he had found growing wild in several parts of that country. This plant, by the negroes termed *billeur*, rises to about ten feet in height; its roots are closely twisted; the wood, which is lighter than cork, is much used by the negroes in fishing, and for transporting them over rivers, which, by reason of their breadth, render swimming, without such a precaution, dangerous.

Goat's thorn, affirmed by Tournefort to be the plant which produces gum-dragant, or tragacanth, is the *astragalus tragacantha* of Linnæus. It is a native of the Levant, and some maritime parts of France, where it grows to the height of two or three feet. The branches are very woolly, and the foot-stalks of the leaves end in long sharp thorns; the gum flows both spontaneously, and by incision, from the roots and trunk, and is generally of a light substance, white, shining, and curled. It is esteemed highly refreshing.

The leaves and seeds of common bladder-fenna have a purgative quality, on which account they are frequently substituted for fenna by the peasants of Languedoc, Provence, and Italy, where the plant naturally grows. The leaves have an acrid nauseous taste.

The leaves of scorpion fenna, the *coronilla emerus* of Linnæus,

næus, are likewise esteemed laxative, and employed by the European peasants for the same purpose as those of the plant above mentioned. A dye is procured, by fermentation, from the leaves, like that of Indigo.

The common laburnum, the *cytusus laburnum* of Linnæus, the *cytusus alpinus latifolius, flore racemoso pendulo*, of Ray and Tournefort, grows naturally on the Alps and the mountains of Dauphiny. It grows to the size of a pretty large tree, with a straight stem; the bark is of a greenish colour; the wood very hard, and when finely polished bears a great resemblance to green ebony; whence the plant is generally known in France by the name of ebony of the Alps. It is frequently used on the continent, and in the highlands of Scotland, for making different kinds of household furniture, as chairs, tables, and bedsteads, which are said to equal the finest mahogany in beauty.

A species of *cytusus*, termed by Linnæus, *cytusus cajan*, is known in the West-Indies, where it naturally grows, by the name of pigeon-pea, from the seeds being the common food of those birds in that part of the world. The leaves are very soft, and covered with a white hoary mealliness on the under surface. The flowers which grow in clusters, are of a yellow colour, and succeeded by pods, containing three, four, or five roundish seeds, or peas, separated from one another by slender transverse partitions. These seeds, besides the use just mentioned, are boiled and eaten, whether green or dry, and being of a binding quality, afford a very wholesome food, especially during the wet season, when dysenteries are so frequent. The wood of the same plant is used for fuel.

The pods of *dolichos urens*, a twisting or climbing plant, are thickly covered with very fine short bristles, or stiff hairs, which sting worse than nettles; hence the title of cow-itch vine, by which this scandent plant is generally known in the West-Indies. The leaves are downy and glisten on their under surface. The seeds are black, and furnished with an eye like those of the bean.

The roots of liquorice, the only part used in medicine,

are pectoral, and of great use in distempers of the lungs, as coughs, catarrhs, shortness of breath, and hoarseness. Its chief place of growth with us is about Pontefract in Yorkshire, and Worktop in Nottinghamshire, where it is propagated for sale. Black liquorice is the inspissated juice of the root of the liquorice plants. The best preparation of this kind is that which is brought from Catalonia in Spain.

From the *hedyfarum albagi* of Linnæus, which grows plentifully in Syria and the eastern countries, flows abundantly a juice, which when condensed upon the plant, is gathered by the inhabitants, and sent to Europe by the name of Persian manna.

From the leaves and small branches of the *indigofera tinctoria* of Linnæus, is prepared that excellent dye, known by the name of indigo. The leaves, when ready for this purpose, are cut down, and thrown into large vats of water, where they are suffered to steep till a violent fermentation ensues, and the water acquiring heat, boils upon every side of the infused leaves, and insensibly becomes of a violet colour. When these effects, which generally happen after sixteen or eighteen hours infusion, are observed, the water is conveyed, by means of cocks at the bottom of the vat, into another vessel, of the nature of a churn, where it is worked, by a negro, with great violence, till the water abounds with a lather, and the salts, and other parts of the substance of the plant are sufficiently united. It is then allowed to settle, and the water, which becomes as clear as at first, is drawn off by means of cocks, leaving at the bottom of the vessel, a sediment or fæcula, like the lees of wine, which, when dried, is the valuable dye known by the name of indigo.

The negroes on the coast of Guinea gather the leaves of the indigo plant at any time of the year, and having pounded them in a mortar, make the paste up into loaves, which they preserve dry. When they want to make use of them in dyeing, they dissolve them in a kind of lee, made of the ashes of an unctuous plant which grows in their fields, the *portulaca marina latifolia* of Plumier, by the negroes called rheme,

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This lee imbibes a tincture of the indigo, into which they dip their linen cold, as often as they think necessary, according to the deepness of the colour required.

The roots of *lathyrus arvensis repens tuberosus* of Bauhin are esteemed an excellent food by the Siberians. They are composed of several small round bulbs, or knobs; whence the plant is termed by Dodonæus, *terræ glandes*, or earth-nuts. In Holland likewise they are sold in the markets, and used for food.

M. Adanson, in his Voyage to Senegal, mentions a leguminous tree, termed farobier by the negroes, who are extremely fond of its pods. The wood is hard and weighty. The pod, or husk, is like that of a French bean, but above a foot in length, and contains a black flat seed, enveloped in a yellow farinaceous substance, which frequently serves them for sustenance, especially on a journey. It is very nourishing, says Adanson, and tastes like the best ginger-bread cake.

Of the wood of the shrubby medic, which is supposed to be the *cytisus* of Virgil, the Turks make handles to their sabres.

The knobs of the root of English wild-wood, or bitter vetch, taste very like liquorice, and are used in the highlands of Scotland for the same disorders of the breast, in which liquorice is proper. The same knobs tempered with water are said to be of singular efficacy in enabling those who use it to sustain hunger and thirst for a very considerable time.

The leaves of common meadow trefoil are drying and binding, useful in fluxes, strangury and heat of urine. Made into a poultice with hog's-lard, they are reckoned good for tumours and inflammations.

The leaves and flowers of melilot, the *trifolium melilotus officinalis* of Linnæus are used in medicine. They soften, discuss, and ease pain, and are frequently ordered in cataplasms against inflammations, hard tumours, and any kind of swelling. Melilot plaster, made of the leaves of this herb boiled in mutton suet, rosin, and wax, is drawing,
and

and good for green wounds, but is chiefly used in dressing of blisters.

PAPPOSÆ, (PAPPUS, *vide infra*) the name of the 11th class in Christopher Knaut's Method, consisting of compound flowers which have their seeds crowned by a

PAPPUS, (thistle-down—*pappi volantes* Lucr. Pliny gives this name to the *senecio* or groundsel, another down-bearing plant. His words are, *Erigeron à nostris vocatur Senecio, al. pappus*);—a sort of feathery or hairy crown, with which many seeds, particularly those of compound flowers, are furnished, for the purpose of dissemination. A seed, surmounted by its *pappus*, resembles a shuttle-cock; so that it is naturally framed for flying, and for being transported by the wind to very considerable distances from its parent plant;—an admirable contrivance of nature to disseminate her productions, and thus render common to different soils and territories, individuals of the same species, which, without such precaution, might have been confined to one. It must be observed, however, that Dandelion, hawk-weed, nipple-wort, groundsel, and many others of our most cumbersome weeds, are disseminated in this manner.

The pappus, as was just hinted, is either simple like hairs, (*pappus pilosus*) as in silk cotton-tree, succulent swallow-wort, colt's-foot, groundsel, golden rod, hawk-weed, doricum, cacalia, and several other compound flowers; or branched like a feather, (*pappus plumosus*) as in valerian, dandelion, fonchus, hemp-agrimony, and cud-weed. In some plants, as hawk-weed, and prenanthes, the *pappus* adheres immediately to the seed; in others, as lettuce, and crepis, it is elevated upon a foot-stalk which connects it with the seeds; in the first case, it is termed by Linnæus, *pappus sessilis*; in the second, *pappus stipitatus*; the foot-stalk or thread upon which it is raised having obtained the name of *stipes*. *Vide STIPES*.

Linnæus has, with surprizing accuracy, pointed out the numerous varieties which obtain in this minute part of the plant, which he generally employs as a distinctive character

rafter in difcriminating the different genera of compound flowers. *Vide* SYNGENESIA.

PEDICELLUS (diminutive from *pediculus*, a foot-stalk) a partial flower-stalk ; the proper stalk of any fingle flower in an aggregate or head of flowers. The principal stalk which fupports all the flowers, is termed the common flower-stalk ; the stalk of each partial flower, if it has one, is ftilled the proper flower-stalk, and by Linnæus, *Pedicellus*.

PEDICULUS (diminutive from *pes*, a foot) a foot-stalk ; a term ufed by the ancient botanifts, to denote the foot-stalks both of flowers and leaves. Linnæus has exploded the term, and, in its place, fubftituted two others, *petiolus*, for the foot-stalk of the leaves ; *pedunculus*, for the foot-stalk of the flowers.

PEDUNCULUS (*pes*, a foot) the foot-stalk of a flower, or head of flowers. Both flower and leaf-stalks were formerly ranged by Linnæus among the trunks : of late years, however, they have loft much of their confequence ; and in the lateft editions of the *Systema Naturæ*, are degraded to a place among the *fulcra*, or parts of plants that ferve for fupport, protection, and defence.

The *Pedunculus*, or flower-stalk, elevates the flower and fruit only, without the leaves ; the *petiolus*, or leaf-stalk fupports the leaves only, without the flower, or fruit. Thus thefe partial trunks ftand effentially diftinguifhed from each other.

Flower-stalks have different epithets, from the place which they occupy on the plant. When they proceed immediately from the root, they are termed radical, (*pedunculus radicalis*) when from the ftem, trunk-stalks, (*pedunculus caulinus*) when from the branch, branch-stalks, (*pedunculus rameus*) and fo of others.

Again, flower-stalks fometimes terminate the ftem or branches ; fometimes proceed from the angle formed by the leaf and ftem, or by the ftem and branch. A flower-stalk of the former kind is termed by Linnæus *pedunculus terminalis* ; of the latter, *pedunculus axillaris*, as it is from the
axilla,

axilla, or arm-pit of the leaf or branch, that the stalk in question is protruded.

Flower-stalks, as well as flowers, are said, in the language of botany, to be *solitary*, when they grow singly, or are produced one by one: *scattered* (*pedunculi sparsi*) when they grow together in great numbers, and are produced without any order.

From the number of fructifications on each foot-stalk, arise other epithets of the *pedunculus*; some bear one, some two, some three flowers; others an indeterminate number; hence the terms *pedunculus uniflorus*, *biflorus*, *multiflorus*, &c. expressive of these several circumstances. A solitary foot-stalk may support many flowers; whilst a solitary flower necessarily implies a single or solitary flower-stalk.

For the different modes in which flowers are borne and connected on their foot-stalks, see the article INFLORESCENTIA.

The flower-stalks frequently afford excellent characters in discriminating the species. Thus a species of globe amaranth is very accurately distinguished by its flower-stalks being furnished with two leaves that are placed opposite, and immediately under each head of flowers.

Flower-stalks, whether of equal or unequal length, that form an even surface at top, are termed by Linnæus *pedunculi fastigiatæ*. The term is exemplified in sweet-william, and viscous campion.

A flower-stalk is termed *flaccid*, (*pedunculus flaccidus*) which is so weak and feeble, as to hang down by the weight of the flower which it supports.

A drooping or nodding flower-stalk (*pedunculus cernuus*) is bent at the top, so that the flower is inclined to one side, or towards the earth, and cannot be placed erect, on account of the curvature of the stalk. This term is exemplified in *carpesium*, drooping-thistle, mountain-scabious, annual sun-flower, and the Siberian species of blessed thistle.

In sweet-weed and *oldenlandia biflora*, the flower-stalks come out in pairs; in a species of balsam, they proceed by threes from the angle of the leaves.

In *jambolifera*, *ochna* and *justicia*, the flower-stalks remain on the plant after the flower and fruit are fallen.

The flower-stalks of *aira flexuosa* take a variety of different directions; those of goat's-beard, *colula*, and most of the nodding flowers, thicken towards the upper extremity.

In some species of Syrian mallow, *sida*, and wood-forrel, the flower-stalks are jointed (*pedunculus articulatus seu geniculatus*.) These circumstances respecting the flower-stalks, will be found to be of singular use in discriminating the species.

PELTA, a very short buckler, or target;—by this name Linnæus characterizes the flower or flat fructification of the genus Lichen or liver wort, which, in most of its species, is glued to the edges of the leaves.

PENTAFORA (πεντε, five; and *fores*, a door) the name of a class in Camellus's Method, consisting of plants with seed-vessels which have five external openings or valves. It is exemplified in flax, lime-tree, Syrian mallow, and silk-cotton tree.

PENTANDRIA (πεντε, five; and ἀνδρ, a man or husband) the name of the fifth class in Linnæus's Sexual Method, consisting of plants which have hermaphrodite flowers with five stamina or male organs.

The orders in this numerous class of plants are six; and, like those of the other plain or numeral classes, are founded upon the number of styles, or female organs.

Night-shade, water-leaf, loose-strife, marvel of Peru, sow-bread, ivy, vine, and the rough-leaved plants, have one style.

Elm, dog's-bane, swallow-wort, gentian, and the umbelliferous plants have two styles.—Sumach, viburnum, tamarisk, bladder-nut, and chickweed, have three styles.

Grass of Parnassus and *evolvulus* have four styles.

Berry-bearing angelica, flax and thrift, have five styles.

Moose-tail has many styles.

PENTANGIÆ (πεντε, five; and ἄγγος, a vessel) the name of the sixteenth class in Boerhaave's Method, consisting of plants with five capsules, or a single seed-vessel divided

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ed internally into five cells. It is exemplified in rue, bean-caper, kalmia, ledum, dwarf rose-bay, strawberry-tree, winter-green, and columbine.

PENTAPETALI (πεντε, five; and πεταλον, a petal or flower-leaf) the name of two classes in Rivinus's Method; consisting of plants whose flowers have five petals, which, in their form, are either regular or irregular. The regular flower of five petals is exemplified in flax, berry-bearing angelica, rock-rose, pæony, mallow, marsh-mallow, and ranunculus; the irregular, in aconite, and lark-spur.

PERFECTUS *flos*, a perfect flower; a term of Ray, Rivinus, Kramer, and Pontedera, corresponding to the *petalodes* of Tournefort, and expressive of the presence of the petals, which, by those authors, were deemed the essential part of every flower. In the Sexual Method, the petals are considered only as the inner cover of the flower, which is solely constituted by the presence of the stamina and stigma, the supposed male and female organs of generation.

PERFORATÆ (*perforari*, to be pierced through) the name of an order in the former editions of Linnæus's Fragments of a Natural Method, consisting of plants, whose leaves have many pellucid spots in them, which, when held up against the light, appear like so many minute dots or points.

The genera in this order were four, St. John's-wort, *ascyrum*, rock-rose, and true orpine (*telephium*). The three former are now removed to the order *Rotaceæ*, the latter to *Miscellaneæ*.

PERIANTHIUM (περι, around, and ανθος, the flower) the flower-cup properly so called; the most common species of calyx, placed immediately under the flower, which is contained in it as in a cup.

The flower-cup, like the other parts of fructification, differs in point of number, figure, proportion, and situation.

Vaillant established for an axiom that in complete flowers, when the calyx is of several pieces, the flower, or corolla, is likewise of several pieces, & *ē contrā*. That this rule is

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erroneous, appears from the pea-bloom flowers, and those of the mallow tribe, in which the calyx consists of one leaf, and the petals are five in number. On the other hand, it may be affirmed with certainty, that when the flower consists of one petal, the calyx always consists of one leaf, although the divisions may be so deep as to induce an opinion, upon a superficial view, that it is composed of several distinct leaves. Thus in the rough leaved plants, the lipped and masqued flowers, and some other natural families, the calyx, although deeply divided, is determined to be of one piece, as the divisions, when the calyx is detached from the flower, adhere closely together, and do not resolve themselves into distinct leaves, as they doubtless would, if divided to the base.

The number of segments in a flower-cup of one piece is generally equal to the number of petals, if the flower consists of more petals than one; or to the number of divisions of the single petal, if the flower contains no more. It may here be proper to observe that a flower-cup consisting of many leaves is rarely found to have its leaves cut into segments; the above rule therefore respects only such flower-cups as have one leaf.

Some flowers, as tulip, crown imperial, and most of the other liliaceous plants, want the flower-cup. In most plants it is single. In morina, side-saddle flower, and some genera of the mallow tribe, double. *Vide* COLUMNIFERÆ.

With respect to the number of leaves of which it is composed, the flower-cup is either of one leaf (*perianthium monophyllum*) as in primrose and thorn-apple; of two leaves, as in poppy, globe-amaranth, cock's-comb, hypecoum, claytonia, and fumatory; of three, as in dock, arrowheaded-grass, tulip-tree, magnolia, custard-apple, and Virginian spider-wort; of four, as in French willow, heath, water-lily, barren-wort, and the cross-shaped flowers, the *tetradynamia* of Linnæus; of five, as in ranunculus, rock-rose, adonis, *jacquinia*, mountain knot-grass, wild orach, golden-rod tree, glass-wort, beet, mouse-tail, flax, and the greater number of flowers with more petals than one; of

fix, as in lion's-leaf, berberry, *hillia*, *flagellaria* and *tetracera* : of seven, as in winter-green, (*trientalis*) of eight, as in *mimusops* and *diapensia* ; or of ten, as in galax.

A flower-cup of one leaf is either undivided, (perianthium integrum) as in genipa and olax ; cut into two segments (perianthium bifidum) as in tuberous moschatel, purslane, and mammee ; into three, as in *burmannia* and cliffortia ; into four, as in ladies bed-straw, and elephant's head ; into five, as in tobacco, and the greater number of flowers that have a calyx of one leaf ; into six, as in *ginora* ; into eight, as in tormentil ; into ten, as in cinquefoil, and herb-bennet ; or into twelve, as in purple loose-strife and water-purslane.

With respect to figure, it may be observed, in general, that the calyx spreads less than the petals ; an erect position being more suitable to its office, which is to prop and contain the flower. In cucubalus, the flower-cup is round like a globe ; in viscous campion it is club-shaped ; in swallow-wort, it is turned backwards.

The leaves or divisions of the flower-cup are either equal, as in most plants ; or unequal, as in rock-rose, tormentil and cinquefoil ; in the two last of which examples, all the divisions of the flower-cup are alternately greater and less ; in rock-rose, two of the five leaves of which the calyx consists, are alternately less than the other three.

The margin of the cup in most plants is entire ; in a species of St. John's wort it is sawed, or indented (perianthium ferratum) ; and in some species of centaury it is fringed like an eye-lash (perianthium ciliatum).

The apex or tip of the flower-cup is sometimes sharp, as in primrose and henbane ; or blunt, as in water-lily and mangostan. In vervain the calyx is cut into five indentments, four of which are sharp, and the fifth, being blunt, looks as if lopped or bit off.

With respect to proportion, the calyx is either shorter than the corolla, as in most plants ; equal to it in length, as in a species of cerasium ; or longer, as in *sagina agrostemma*, and a species of calve's snout.

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When the flower-cup includes the stamina and not the seed-bud, as happens in French-willow, and all the other flowers which have their seed-bud placed below the receptacle of the flower, it is termed the perianthium of the flower; when the seed-bud and not the stamina, the perianthium of the fruit; when both stamina and seed-bud, the perianthium of the fructification. *Linnaea*, clove-tree, and *morina*, have two *perianthiums*, which serve very properly to illustrate the terms just mentioned; one of these cups is appropriated to the flower, the other to the fruit. The perianthium of the fructification is exemplified in pæony, and the greater number of plants.

With respect to composition, the flower-cup sometimes consists of a number of leaves which are laid over one another like tiles or scales, (perianthium imbricatum) as in hawk-weed, sow-thistle, and camellia; sometimes of scales that spread wide, and are diffused on all sides, (perianthium squarrosum) as in thistle, and flea-bane, in which the scales are not closely laid upon one another, as in hawk-weed, but diverge on every side. In pink, tick-seeded sunflower, water hemp-agrimony and bastard hawk-weed, the base of the flower-cup, which is simple, is surrounded externally by a series of distinct leaves, shorter than its own. This sort of flower-cup *Linnaeus* terms *calyx auctus*, an increased or augmented calyx; *Vaillant* had termed it, with equal propriety, *calyx calyculatus*; that is, a flower-cup furnished with a lesser flower-cup.

With respect to duration, the flower-cup either falls off at the first opening of the flower, (perianthium caducum) as in poppy and barren-wort; with the flower, that is, the petals, stamina, and style, (perianthium deciduum) as in berberry, and the cross-shaped flowers; or continues till the fruit has attained maturity (perianthium persistens) as in the lipped and masqued flowers, and several others.

Lastly, a flower-cup is proper to one flower, as in all the plants with simple flowers; or common to many, as in scabious and the compound flowers.

PERICARPIUM ($\pi\epsilon\rho\iota$, round; and $\kappa\alpha\rho\pi\omicron$, fruit) the seed.

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seed-vessel ; an entrail of the plant, big with seeds, which it discharges when ripe. The seed-vessel is, in fact, the developed seed-bud, and may very properly be compared to the fecundated ovary in animals ; for it does not exist till after the fertilizing of the seeds by the male dust, and the consequent fall of the flower. All plants, however, are not furnished with a seed-vessel ; in such as are deprived of it, the receptacle or calyx performs its functions, by inclosing the seeds as in a matrix, and accompanying them to perfect maturity. This is particularly the case with the rough-leaved plants, and those of the first order of the class *Didynamia* of Linnæus. *Vide ASPERIFOLIÆ, et VERTICILLATÆ.*

The different species of *pericarpium* enumerated by Linnæus are as follows ;

- I. Capfula.
- II. Siliqua.
- III. Legumen.
- IV. Folliculus, — Formerly *conceptaculum*.
- V. Drupa.
- VI. Ponium, — — *Fructus carnosus* of others.
- VII. Bacca.
- VIII. Strobilus, — — *Conus* of Tournefort.

Each of these terms is explained in its proper place.

Although the seed-vessel, like the other parts of fructification, is commonly employed to discriminate the genera only ; yet such striking circumstances in its structure as, for want of uniformity, cannot enter into the generic difference, are frequently used, with elegance, to distinguish the species. Thus the inflated pod of *fumaria vesicaria* ; the top-shaped fruit of the pear ; the twisted seed-vessel of a species of meadow-rue, some species of screw-tree and meadow-sweet ; the prickly fruit of caltrops, and such like characters, which do not run through a whole genus, afford very certain marks of distinction in determining the species, and ought to be employed without reserve.

PERSISTENS

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PERSISTENS (*perfitto*, to continue)—Permanent. This term is expressive of the third and longest stage of duration in plants, and, like the other terms of duration (*caducus* and *deciduus*) admits of different significations, according to the part of the plant to which it is applied. Leaves are said to be permanent which remain till the fruit is ripe. Stipules are permanent which continue on the plant after the fall of the other leaves; and this epithet is applied to such perianths, or flower-cups, as inclose the naked seeds, and, supplying the place of a *pericarpium*, accompany them to maturity. This last is the most common use of the term in Botanical language, and it is exemplified in the *asperifoliae*, or rough-leaved plants of Ray, and in those of the order *gymnospermia* of the class *didynamia* of Linnæus. *Vide CADUCUS et DECIDUUS.*

PERSONATUS *flos*, (*persona*, a masque) a masqued flower; a flower with an irregular petal, resembling the head or snout of an animal. *Vide RINGENS flos.*

The masqued flowers constitute part of a class in Tournefort's Method, by the name of *flores tubulati, personati*, which partly correspond to the *didynamia angiospermia* of the Sexual Method.

PERSONATÆ, the name of the fortieth order in Linnæus's Fragments of a Natural Method, consisting of a number of plants, whose flowers are furnished with an irregular gaping or grinning petal, which, in figure, somewhat resembles the snout of an animal.

Most of the genera of this natural order arrange themselves under the class and order *didynamia angiospermia* of the Sexual Method. The rest, although they cannot enter into the artificial class just mentioned, for want of the classic character, (the inequality of the stamina,) yet, in a natural method, which admits of greater latitude, may be arranged with the *Personatæ*, which they resemble in their habit and general appearance, and particularly in the circumstance expressed in the title.

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List of the Genera contained in this Natural Order.

S E C T I O N I.

Plants with masqued Flowers having their Stamina of an equal length.

Linnæan Genera.		English Names.
<i>Collinsonia.</i>		
<i>Dianthera.</i>		
<i>Gratiola,</i>	—	— Hedge-hyffop.
<i>Justicia,</i>	—	— Malabar-nut.
<i>Scoparia.</i>		
<i>Verbena,</i>	—	— Vervain.
<i>Veronica,</i>	—	— Speedwell.

S E C T I O N II.

Plants with masqued Flowers having two long and two short Stamina.

<i>Acanthus,</i>	—	— Bear's breech.	
<i>Antirrhinum,</i>	—	— Calve's - finout,	toad's - flax,
		snap-dragon.	
<i>Avicennia.</i>			
<i>Barleria.</i>			
<i>Bartsia.</i>			
<i>Besleria.</i>			
<i>Bignonia,</i>	—	— Trumpet-flower.	
<i>Bontia.</i>			
<i>Buchnera.</i>			
<i>Capraria,</i>	—	— Sweet-weed.	
<i>Chelone.</i>			
<i>Citharexylon,</i>	—	— Fiddle-wood.	
<i>Clerodendrum.</i>			
<i>Columnnea.</i>			
<i>Cornutia.</i>			

Craniolaria,

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Linnæan Genera.	English Names.
<i>Craniolaria.</i>	
<i>Cymbaria.</i>	
<i>Dodartia.</i>	
<i>Duranta.</i>	
<i>Erinus.</i>	
<i>Euphrasia,</i> —	— Eye-bright.
<i>Gerardia.</i>	
<i>Gesneria.</i>	
<i>Gmelina.</i>	
<i>Halleria,</i> —	— African fly—honey-suckle.
<i>Lantana,</i> —	— American Viburnum.
<i>Lathræa.</i>	
<i>Manulea.</i>	
<i>Martynia.</i>	
<i>Melampyrum,</i> —	— Cow-wheat.
<i>Mimulus,</i> —	— Monkey-flower.
<i>Obolaria.</i>	
<i>Orobanche,</i> —	— Broom-rape.
<i>Ovieda.</i>	
<i>Pedicularis,</i> —	— Rattle-coxcomb, or house-wort.
<i>Petrea.</i>	
<i>Phryma.</i>	
<i>Rhinanthus,</i> —	— Elephant's-head.
<i>Ruellia.</i>	
<i>Schwalbea.</i>	
<i>Scrophularia,</i> —	— Fig-wort,
<i>Stemodia.</i>	
<i>Torenia.</i>	
<i>Tozzia.</i>	
<i>Vandellia.</i>	
<i>Vitex,</i> —	— Agnus castus, or chaste-tree.
<i>Volkameria.</i>	

Habit and Structure of the Plants of this Order.

This order furnishes both herbaceous and woody vegetables of the shrub and tree kind.

The

The **ROOTS** are generably fibrous and branched ; in *gerardia* and *tozzia*, they are tuberous. The roots of broom-rape are parasitical ; that is, attach themselves to the roots of other plants, from which they derive their nourishment.

The **STEMS** and branches are cylindrical when young, except in some species of fig-wort, in which they are square.

The **LEAVES** are simple, generally placed opposite in pairs at the bottom of the branches, but in many genera, stand alternate towards the top. In *lathræa*, *cymbaria*, and *stemodia*, the leaves are placed alternate from the bottom to the summit of the branches. The leaves of *petrea* are so rough, that they serve to file and polish wood ; those of broom-rape and *lathræa* resemble scales. In hedge-hyssop and *limosella*, the leaves are transparent, and seem marked with dots or minute points. In *halleria*, they have several small prominences or knots on the under surface. In a species of *volkameria*, after the fall of the leaves, the lower part of the foot-stalk remains attached to the branches under the form of a thorn. The same appearance is observed in the genus *Tournefortia*. *Vide ASPERIFOLIÆ.*

Some species of trumpet-flower have the common foot-stalk of their winged leaves terminated by a tendril, with three or five branches. In a species of *cornutia* is observed a *stipula* or scale, in form of a half-moon, of the same substance with the leaves, between which it is placed.

The **FLOWERS** are universally hermaphrodite. They proceed either singly, or in clusters, from the wings of the leaves, as in American *viburnum*, *bontia*, *columnnea*, hedge-hyssop, and fig-wort ; or terminate the branches in a spike, panicle, or head, as in *cornutia*, *clerodendrum*, *gmelina*, *vervain*, and *agnus castus*. In the latter they seem placed in whirls.

The **CALYX** or flower-cup is of one leaf, which is cut into two, three, four, or five divisions that are permanent. In trumpet-flower the calyx falls off early, and generally resolves itself into five distinct leaves. The flower-cup of *bartsia* is of a beautiful-red colour at its apex, by which
striking

striking character the genus in question is chiefly distinguished from eye-bright, elephant's-head, and rattle coxcomb, to which it otherwise seems nearly allied. The genus *cymbaria* stands distinguished from the other genera by the numerous divisions of the calyx.

The COROLLA is composed of one irregular petal with two lips, resembling, as was already observed, the head or snout of an animal. In toad-flax, the petal is terminated behind by a nectarium in form of a spur.

The STAMINA in plants of the first section, are two or four in number, and of an equal length; in those of the second, they are universally four in number, two of which are longer than the other two. In hedge-hyssop, and some species of vervain, the filaments are four in number, but two of these only are terminated by anthers; so that the number of perfect stamina in these plants is only two; the other two being, in the language of Linnæus, castrated. The filaments likewise of vervain are generally of an unequal length. In *dianthera*, as the name obscurely imports, two anthers are placed upon each filament; and in *chelone*, the rudiment of a fifth filament, without the anther, is placed within the upper pair of stamina.

The SEED-BUD is single and placed above the receptacle of the flower. The style is single, thread-shaped, bent in the direction of the stamina, and crowned with a stigma, which is generally blunt, and sometimes divided into two. In American viburnum, the summit of the style is hooked; in which circumstance consists the essential character of the genus. In broom rape, and *lathræa*, a glandular nectarium is seated at the base of the seed-bud.

The SEED-VESSEL is a capsule, generally divided internally into two cavities, and externally into the same number of valves. In *lathræa*, *dianthera*, *justicia*, *barleria*, *ruellia*, and bear's-breech, the capsule opens with an elastic spring.

The SEEDS are numerous, and affixed to a receptacle in the middle of the capsule.

These plants possess nearly the same qualities with the lipped-flowers, though in a less degree.

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The powder of the roots and leaves of officinal vervain, or an infusion of them in water, is applied with success, both internally and externally, in dangerous ulcers, and tumours of the viscera, particularly those of the spleen. Both root and leaves have a bitter and disagreeable taste. The plant is generally found in the neighbourhood of dwelling-houses.

The juice of a species of vervain with blue flowers, which grows naturally in the West-Indies, is said to be so powerful a deobstruent, that a large spoonful taken inwardly, for three or four mornings in succession, has greater efficacy in bringing down the catamenia, than either the use of chalybeate medicines, or any other method.

Fluellin, male speed-well, or officinal veronica, is reckoned among the vulnerary plants, and used both inwardly and outwardly. It is likewise pectoral. The fumes of a decoction of this plant in water and vinegar being received into the mouth, by means of a funnel, are said to be a sovereign remedy in suffocations, and asthma, occasioned by a collection of phlegm in the lungs. The herb is used as tea in gouty and rheumatic disorders. The leaves have a somewhat bitter taste, with little or no smell.

Brook-lime, the *veronica beccabunga* of Linnæus, is used in infusion for the scurvy, and is a principal ingredient in most diet-drinks for that distemper. The herb is almost insipid to the taste, and without smell.

Round leaved female fluellin, the *antirrhinum spurium* of Linnæus, is successfully used in fluxions and inflammations of the eyes.

Toad-flax, the *linaria vulgaris* of former botanists, the *antirrhinum linaria* of Linnæus, is rarely used internally; externally it is of efficacy in the piles. The distilled water of the herb is said to be an excellent cosmetic.

Eye-bright has been long esteemed a specific in disorders of the eyes, especially for dimness of sight, as the name seems to import. Its internal use, and even the propriety of its external application, has been of late greatly disputed.

The berries of several species of *camara*, or American *viburnum*,

Airburnum, which grow naturally in the West-India islands, and are known by the name of wild sage, serve for food to sparrows and other birds. The leaves, either boiled into a decoction, or infused like tea, are an excellent sudorific.

The roots of fig-wort powdered, and made into a plaster with wax and soap, are said to dissipate cold scrophulous tumours in the neck. A decoction of the leaves cures the itch.

The leaves of water-betony, the *scrophularia aquatica* of Linnæus, are sometimes used in the form of snuff, to promote sneezing.

Collinsonia, a native of Pensylvania, and other parts of North America, from which it was introduced into Europe by the ingenious Mr. Bartram, is possessed of a peculiar scent, which, though agreeable, is so very strong, as frequently to give a violent head-ach, especially when the plant is abundant, and in flower. An infusion of *Collinsonia* in water, taken internally, has been found efficacious in dispelling the poison occasioned by the bite of the rattle-snake; nor is the outward application of the herb less successful in pains of the limbs, when the parts affected are rubbed with it. In New-York they distinguish this plant by the name of horse-weed, because the horses eat it in spring, before any other herbs make their appearance.

PETALUM, (πεταλον, a leaf); a petal or coloured leaf of the flower. *Vide* COROLLA.

PETIOLUS, (diminutive *a pede, quasi pediculus*.—By *Columella* it is used for the fruit-stalk—"Petioli quibus pendent mala,")—the foot-stalk of the leaves; one of the *fulcra* of plants, according to Linnæus, or parts that serve for support, protection and defence. As the leaves and fructification are generally supported by different foot-stalks, Linnæus has very properly marked this distinction, by assigning to each foot-stalk a different name; *pedunculus* to that of the flower; *petiolus* to that of the leaves. In a very few instances, however, as turnera and Syrian mallow, the same foot-stalk supports both flower and leaves.

The foot-stalk of the leaves is of a green colour, some-
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times cylindrical, but most commonly furnished with two distinct surfaces, a front, and a back; the former flat, the latter round and convex. By this configuration, the footstalks of compound leaves are generally with accuracy distinguished from the young branches, with which beginners are very apt to confound them. *Vide FOLIUM.*

This part of the plant sometimes affords very elegant marks of distinction in discriminating the species. Thus the winged footstalks of the orange-tree, and *hedysarum triquetrum*, sufficiently distinguish each from its respective congeners.

PILEUS, a hat or bonnet; the orbicular horizontal expansion or upper part of a mushroom, which covers the fructification. This, from its figure, is properly enough termed by botanists the hat of the mushroom.

PILI, hairs; one of the species of *pubes* or defensive weapons with which several plants are furnished. *Vide PUBES.*

PIPERITÆ (*piper*, pepper) the name of the second order in Linnæus's Fragments of a Natural Method, consisting of pepper, and a few genera which agree with it in habit, structure, and sensible qualities, particularly the latter.

List of the Genera contained in this Order.

Linnæan Genera.	<i>English Names.</i>		
<i>α Ambrosinia.</i>			
<i>Arum,</i>	—	—	Cuckow-pint, or wake-robin.
<i>Calla,</i>	—	—	African arum.
<i>Dracontium,</i>	—	—	Dragons.
<i>Pothos.</i>			
<i>Zostera,</i>	—	—	Grass-wrack.
<i>β Acorus,</i>	—	—	Sweet-rush, or calamus aromaticus.
<i>Orontium,</i>	—	—	Floating arum.
<i>Piper,</i>	—	—	Pepper.
<i>Saururus,</i>	—	—	Lizard's-tail.

These plants are mostly herbaceous and perennial. The
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stalks

stalks of *potos* creep along rocks and trees, into which they strike root at certain distances. The greatest height to which any of these plants is known to attain, is fifteen feet; the greater part do not exceed three or four.

The fleshy roots of many of these plants, particularly those of several species of arum, are extremely acrid when fresh. They lose this pungent quality, however, by being dried, and become of a soapy nature. The smell of many of the arums, and of some other plants of this order, particularly *Dracontium fetidum*, is very offensive, frequently resembling the odour of human excrements. The flowers, however, of an Ethiopian species of *dracunculus*, or arum, the *Calla Æthiopica* of Linnæus, and the cover in which they are involved, are said to emit a very fragrant odour.

With respect to their virtues, these plants are astringent. The sacula of common arum possesses the diaphoretic virtue of antimony; the powder of its root attenuates and dissipates obstructions.

In hot countries, the tuberous roots of many of the arums, particularly those of the species called colocasia, are dried and eaten by the inhabitants, either roasted or raw. In the West-Indies too, the leaves of some of the sorts, particularly that with a water-lily-leaf, are boiled and eaten as greens; hence the names of Indian kale, and esculent arum, which have been given to this species.

The native Indians in North-America, boil the spadix and berries of the Virginian arum, which they esteem as a dainty. These berries, when raw, have a harsh pungent taste, which they lose in a great measure by being boiled. They eat likewise the roots, which often grow to the thickness of a man's thigh, and when fresh, have a pungent taste, and are reckoned poisonous. For this reason they never venture to eat them till the deleterious juice has been totally expelled by the force of fire, when they devour them with great avidity. Prepared in this manner, they taste like potatoes. This species, however, is never, like those mentioned in the preceding paragraph, dried and preserved for use, but taken fresh out of the marshes as it is wanted.

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From the root of *Calla Æthiopica*, the *Arum Æthiopicum* of Commelyn, the Hottentots, we are told, prepare a farinaceous substance, which they use instead of bread, and which, by the Europeans at the Cape, is commonly called Hottentot-bread. Its acrimony they extract by boiling it in two or three fresh waters, after which, they adapt it to their taste by drying it in the sun, and roasting it in embers. The flower of this species of *calla* is white, as was observed above, and of a fragrant smell resembling musk. The root is white and large, and, when cut in slices, says Kolben, bears so strong a resemblance to Spanish radish, that the Cape Europeans, for the sake of amusement, frequently pass the former upon strangers for the latter. But the mirth, he continues, of this deceit, is frequently spoiled by the resentment of the deceived. For so very tormenting is the effect of the *arum* upon the palate, and to such a degree doth it sting and inflame the mouth, that the pain is scarcely supportable, and greatly exasperated by the drinking of water, to which a stranger is always tempted to have recourse, with a view of allaying it.

The succulent fruits of the genus *pothos* are eaten like strawberries.

The stalks of sweet-rush, when rubbed, emit a very agreeable aromatic smell, as do the leaves when broken. The roots are sometimes used in decoction.

The natives of the Asiatic islands chew incessantly with the areca-nuts the leaves of a species of pepper, termed betel. They commonly wrap up a quarter of an areca-nut in some betel leaves, and so chew them together. This juice, which they pretend fortifies their gums and stomach, is as red as blood, and gives a like tincture to the spittle and lips, but blackens the teeth prodigiously. The taste, at first, is said to be insupportably acrid.

Pepper of Senegal is different from that of India. The plant bears a round berry about the bigness of hemp seed, which, when ripe, is of a beautiful-red colour, and of a sweetish taste. It contains a seed of the shape and bigness of a grain of cabbage, but very hard, and possessing an agree-

able poignancy. The berries grow in small bunches on a shrub that is three or four feet high, and has thin supple branches, furnished with oval leaves, that are pointed at the ends, very greasy, and not unlike those of the privet.

PISTILLUM, (properly a pestle to pound, or stamp with, in a mortar—a *pinso*, *pistum*, *id est*, *tundo*, to beat) the pestle, pistil, or pointal; an erect column, generally placed in the centre of the flower, within the stamina, and supposed by the sexualists to be the female organ of generation in plants. Its parts are three.

I. The *germen*, or seed-bud, which exists before the bursting of the anthers, and is, in fact, the rudiments of the seed-vessel, vulgarly called the fruit. This is the base or lower part of the pointal.

II. The style or *vagina*, elevated by the seed-bud. From the number of styles, not of seed-buds, arise the orders or secondary divisions in the Sexual Method.

III. The *stigma*, or summit of the style, which receives the *pollen* or male dust, upon its dispersion by the bursting of the *anthers*, and transmits it elaborated to the seed-bud below.

Each of these principal parts of the flower is particularly explained under its respective term.

PLACENTATIO, a term of habit, expressive of the disposition of the side-lobes of the seed, or seminal leaves, about the time of the sprouting of the embryo plant. *Vide* COTYLEDONES.

Some plants have no seed-leaves, some have one, but the greater number rise with two. *Vide* ACOTYLEDONES, MONOCOTYLEDONES, and DICOTYLEDONES.

PLANIPITALÆ, (from *planus*, flat, plain, and *petalum*, a petal or flower-leaf,) the name of a class in Ray's Method, consisting of plants with compound flowers, composed of florets with flat or plain tongue-shaped petals. The term is exemplified in succory, dandelion and hawkweed, and corresponds to the *semisofculosi* of Tournefort.

PLENUS *flos*, a full flower; a term expressive of the highest degree of luxuriance in flowers. The petals in full flowers are so multiplied, as to exclude all the stamina, and frequently

frequently to choak up the female organ, so that such flowers, although the most delightful to the eye, are both vegetable monsters and vegetable eunuchs: the unnatural increase of the petals constituting the first; the consequent exclusion of the stamina or male organs, the latter.

Flowers with more petals than one are most liable to this, as well as the inferior degrees of luxuriance. The following are well-known examples; ranunculus, anemone, marsh-marigold, columbine, fennel-flower, poppy, pæony, pink, gilliflower, campion, viscous campion, lily, crown imperial, tulip, narcissus, rocket, mallow, Syrian mallow, apple, pear, peach, cherry, almond, myrtle, rose, and strawberry.

Flowers with one petal are more rarely subject to fullness. That they are not, however, totally exempted, appears from polianthes, hyacinth, primrose, crocus, meadow-saffron, and thorn-apple. With these familiar examples before his eyes, Kramer did not hesitate to assert, that a full flower with one petal, is a contradiction in terms.

In flowers with one petal, the mode of luxuriance, or impletion, is, by a multiplication of the divisions of the limb or upper part; in flowers with more petals than one, by a multiplication of the petals or nectarium.

To take a few examples: columbine is rendered full in three different ways; 1. by the multiplication of its petals, and total exclusion of the nectaria; 2. by the multiplication of the nectaria, and exclusion of the petals; or, 3. by such an increase of the nectaria only, as does not exclude the petals, between each of which are interjected three nectaria, placed one within another. Again, fennel-flower is rendered full, by an increase of the nectaria only; narcissus either by a multiplication of its cup and petals, or of its cup only; lark-spur, commonly by an increase of the petals, and exclusion of the spur, which is its nectarium. In *japonaria concava anglica*, the impletion is attended with the singular effect of incorporating the petals, and reducing their number from five to one; and in gelder-rose, the luxuriance is effected by an increase both in magnitude, and

number of the plain, wheel-shaped, barren-florets of the circumference of the head of flowers, and an exclusion of all the bell-shaped hermaphrodite florets of the centre.

Hitherto we have treated of plenitude in simple flowers only: the instance just now adduced seems to connect the different modes of impletion in them and compound flowers. Before I proceed further, however, it will not be improper to premise, that as a simple luxuriant flower is frequently, by beginners, mistaken for a compound flower in a natural state, such flowers may always be distinguished with certainty by this rule: that in simple flowers, however luxuriant, there is but one *pistillum* or female organ; whereas in compound flowers each floret, or partial flower, is furnished with its own proper *pistillum*. Thus in hawk-weed, a compound flower, each flat or tongue-shaped floret in the aggregate has its five *stamina* and naked seed; which last is, in effect, its *pistillum*: whereas, in a luxuriant *lychnis*, which is a simple flower, there is found only one *pistillum* or female organ common to the whole.

In a compound radiated flower, which generally consists of plain florets in the radius, and tubular or hollow florets in the disk, plenitude is effected either by an increase of the florets in the margin, and a total exclusion of those in the centre; which mode of luxuriance is termed impletion by the radius, and resembles what happens in the gelder-rose; or by an elongation of the hollow florets in the centre, and a less profound division of their brims; which is termed impletion by the disk.

In the first mode of luxuriance, the florets in the centre, which are always hermaphrodite or male, are entirely excluded; and in their place succeed florets similar in sex to those of the *radius*. Now, as the florets in the margin of a radiated compound flower are found to be always either female, that is, furnished with the *pistillum* only; or neuter, that is, furnished with neither *stamina* nor *pistillum*; it is evident, that a radiated compound flower, filled by the *radius*, will either be entirely female, as in fever-few, daisy, and African marigold; or entirely neuter, as in sun-flower,
marigold,

marigold, and centaury. Hence it will always be easy to distinguish such a luxuriant flower from a compound flower with plain florets in a natural state; as these florets are all hermaphrodite, that is, furnished with both *stamina* and *pistillum*. Thus the full flowers of African marigold have each floret furnished with the *pistillum* or female organ only: the natural flowers of dandelion, which, like the former, is composed of plain florets, are furnished with both *stamina* and *pistillum*.

In the second mode of luxuriance, termed impletion by the disk, the florets in the margin sometimes remain unchanged; but most commonly adopt the figure of those in the centre, without, however, suffering any alteration in point of sex; so that confusion is less to be apprehended from this mode of luxuriance than from the former. Besides, the length to which the florets in the centre run out, is, of itself, a sufficient distinction, and adapted to excite at once an idea of luxuriance. Daisy, fever-few, and African marigold, exhibit instances of this as well as of the former mode of impletion.

In luxuriant compound flowers with plain florets, the *femiflorescensi* of Tournefort, the *stigma* or summit of the style in each floret is lengthened, and the seed-buds are enlarged and diverge; by which characters such flowers may always be distinguished from flowers of the same kind in a natural state. Scorzouera, nipple-wort, and goat's-beard, furnish frequent instances of the plenitude alluded to.

Lastly, the impletion of compound flowers with tubular or hollow florets, the *florescensi* of Tournefort, seems to observe the same rules as that of radiated flowers just delivered. In everlasting flower, the *xeranthemum* of Linnæus, the impletion is singular, being effected by the enlargement and expansion of the inward chaffy scales of the calyx. These scales, which become coloured, are greatly augmented in length, so as to over-top the florets, which are scarce larger than those of the same flower in a natural state. The florets too in the margin, which in the natural flower are female, become, by luxuriance, barren; that is, are deprived of the

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pistillum; the style, which was very short, spreads, and is of the length of the chaffy scales, and its summits, formerly two in number, are metamorphosed into one.

Full flowers are more easily referred to their respective genera in methods founded upon the calyx, as the flower-cup generally remains unaffected by this highest degree of luxuriance.

PLUMULA, a little feather; the scaly part of the *corculum* or embryo plant within the seed, which ascends and becomes the stem or trunk. It extends itself into the cavity of the lobes, and is terminated by a small branch resembling a feather, from which it derives its name. *Vide* CORCULUM and GERMINATIO.

POLLEN, properly fine flower, or the dust that flieth in the mill. By Columella it is used of the fine dust or powder of frankincense—in Botany, the fecundating or fertilizing dust contained within the anthers or tops of the *stamina*, and dispersed upon the female organ when ripe, for the purpose of impregnation. *Vide* SEXUS *Plantarum*.

This dust corresponding to the seminal fluid in animals, is commonly of a yellow colour, and very conspicuous in the summits of some flowers, as tulip and lily. Its particles are very minute, and of extreme hardness. Examined by the microscope, they are generally found to assume some determinate form, which often predominates, not through all the species of a particular genus only, but also through the genera of a natural family or order.

The powder in question being triturated and otherwise prepared in the stomach of the bees, by whom great quantities are collected in the hairy brushes with which their legs are covered, is supposed by some authors to produce the substance known by the name of wax; a species of vegetable oil, rendered concrete by the presence of an acid, which must be removed before the substance can be rendered fluid.

POLYADELPHIA (*πολυς*, many, and *ἀδελφία*, a brotherhood) many brotherhoods. The name of the eighteenth class in Linnæus's Sexual System, consisting of plants with hermaphrodite

hermaphrodite flowers, in which several *stamina* or male organs are united by their filaments into three or more distinct bundles.

This class, which contains very few genera, is subdivided into four orders from the number of *stamina*.

Chocolate-nut has five *stamina*, or rather five bundles of *stamina*, each filament having five *anthers* or tops.

Mansonia has fifteen *stamina* in five bundles.

Citron, orange, and lemon, which belong to the same genus, *citrus*, have twenty *stamina* formed into a great number of bundles.

Melaleuca, *hopea*, St. John's wort, and St. Peter's wort, have many *stamina*, which, in the three former, are collected into five, in the latter, into four bundles.

POLYANDRIA (*πολυς*, many, and *ανηρ*, a man, or husband) many husbands; the name of the thirteenth class in Linnæus's Sexual Method, consisting of plants with hermaphrodite flowers furnished with several *stamina* that are inserted into the common receptacle of the flower. By this circumstance chiefly, though not expressed in the title, is the class under consideration distinguished from that immediately preceding it, termed *icosandria*, in which, although a numeral class, the most striking character is the situation of the *stamina*, which are inserted into the calyx or petals, or both. The number of *stamina* in the two classes being indeterminate, would frequently clash, and hence create mistakes: their insertion is an invariable character, and therefore an unerring mark of distinction.

This numerous class of plants, the fruits of which are frequently poisonous, is subdivided into seven orders, from the number of the styles or female organs.

Poppy, herb-christopher, rock-rose, and water-lily, have one female organ.

Pæony, and *calligonum*, have two styles, or female organs.

Lark-spur, and monk's-hood, have three; *tetracera* has four.

Columbine,

Columbine, and fennel-flower, have five; water-soldier, or marsh-aloe, six; virgin's-bower, meadow-rue, hellebore, marsh-marigold, anemone, globe-ranunculus, custard-apple, tulip-tree, magnolia, ranunculus, and adonis, have many styles.

POLYANGIÆ (*πολυς*, many, and *ἄγγος*, a vessel) the name of the twentieth class in Boerhaave's Method, consisting of plants which have many capsules, or a single capsule divided into numerous cells. It is exemplified in marsh-marigold, hellebore, globe-ranunculus, and water-lily.

POLYGAMIA (*πολυς*, many, and *γάμος*, marriage) polygamy. This term, expressing an inter-communication of sexes, is applied, by Linnæus, both to plants and flowers. A polygamous plant is that which bears both hermaphrodite flowers and male or female, or both. This will be particularly explained below. Polygamy of flowers respects the inter-communication of the florets in a compound flower. The different modes of polygamy in compound flowers, arising from the different combinations of sexes, have been adopted by Linnæus as very proper circumstances, in a method founded upon the sexes, for subdividing that numerous and difficult class of plants. The subject, therefore, of the polygamy of flowers falls more properly to be handled under the article SYNGENESIA, whither we refer our readers.

POLYGAMIA, is likewise the name of the twenty-third class in Linnæus's Sexual Method, consisting of polygamous, or mongrel plants, that is, plants having hermaphrodite flowers, and likewise male or female flowers, or both.

A plant to be polygamous must have some of its flowers hermaphrodite: for by that circumstance alone is its connection cut off with the plants of the classes *monœcia* and *diœcia*, in the former of which the plants are androgynous, that is, bear male and female flowers upon the same root; in the latter, male and female. This rule, however, admits of a few exceptions, which will be mentioned afterwards.

wards. Further, the polygamy may be either on the same plant, or on distinct plants from the same seed. The modes of which it is susceptible, are as follows :

I. Hermaphrodite and male flowers on the same plant, as in white hellebore, nettle-tree, cross-wort, and ægilops. This kind of polygamy is likewise observable in several of the umbelliferous plants, particularly carrot, fennel, hog's-fennel, coriander, chervil, shepherd's-needle, Alexanders, carui, and bastard-parsley. These plants, therefore, ought, in strict conformity to the principles of the Sexual Method, to have been arranged under the class *polygamia*; though I think Linnæus has judged far better to place them with the other umbelliferous flowers, as so unnatural a separation must have struck a fatal blow at the very root of his system. It is evident, however, that the same objection continues in force against the principles of his method; since, if carried into rigid execution, they have a direct tendency to commit the most violent outrages against Nature, by disjoining things which were never meant to be separated.

II. Hermaphrodite, and male flowers on distinct plants, as in palmetto, ginseng, Indian-date plum, and tupelo-tree.

III. Hermaphrodite and female on the same plant, as in pellitory and orach.

IV. Hermaphrodite and female on different plants, as in most species of ash-tree.

V. Androgynous and male upon distinct roots, as in *arctopus*, and amber-tree, which have male and female flowers upon one plant, and male flowers only on the other.

VI. Androgynous, male and female upon three distinct plants, as in carob-tree and fig-tree. This and the former case, having no hermaphrodite flowers, seem to be exceptions to the definition of polygamious plants given above.

VII. Hermaphrodite, male and female upon two distinct plants, as in three-thorned *acacia*, in which the male and hermaphrodite flowers are placed upon one plant, and the female flowers on the other.

VIII.

VIII. Male hermaphrodites, and female hermaphrodites on the same plant; that is, flowers which, although they contain the parts proper to each sex, have one of the parts reciprocally abortive; the *stamina* or male organ in some, the *pistillum* or female organ in others. In the former case they are stiled female hermaphrodites, in the latter, male hermaphrodites, according as either sex is predominant. This singular mode of polygamy, if it can be called such, is observed in the flowers of plantain or banana tree.

POLYSPERMÆ, (*πολυς*, many, and *σπέρμα*, a seed) the name of the fifteenth class in Ray's Method, consisting of plants with many capsules or seeds. It is exemplified in marsh-marigold, hellebore, and globe ranunculus.

POLYSTEMONES (*πολυς*, many, and *στημων*, a stamen) the name of the eighth class in Haller's Natural Method, consisting of plants which, as the name imports, have many *stamina* or male organs. It is exemplified in poppy, ranunculus, mallow, cherry, and rose. The *stamina* in this class are generally triple the number of petals.

POMACEÆ (*pomum*, an apple) the name of the thirty-sixth order in Linnæus's Fragments of a Natural Method, consisting of the following genera, which have a pulpy esculent fruit of the apple, berry, and cherry kind.

Linnæan Genera.		English Names.
α	<i>Cratægus</i> , —	— Wild-service thorn.
	<i>Mespilus</i> , —	— Medlar.
	<i>Pyrus</i> , —	— Apple, pear.
	<i>Ribes</i> , —	— Currant-tree.
	<i>Sorbus</i> , —	— Service-tree.
	<i>Spiræa</i> , —	— Spiræa frutex, spiked willow, drop-wort.
β	<i>Punica</i> , —	— Pomegranate.
γ	<i>Amygdalus</i> , —	— Almond-tree, peach.
	<i>Chrysobalanus</i> , —	— Cocoa-plum.
	<i>Prunus</i> , —	— Plum, apricot, cherry.

Habit and Structure of the Plants of this Order.

The plants of this order, which furnishes many of our most esteemed fruits, are mostly of the shrub and tree kind.

The **ROOTS** are branched, fibrous, and in the greater part very long. In dropwort, the *spiræa filipendula* of Linnæus, they consist of a great number of oval knobs or glands, which hang, or are fastened together by slender fibres; from which circumstance are derived both its English and scientific names.

The **STEMS** and branches are cylindric. These last are placed alternate; and, when young, are, in some genera, angular. The bark is thick and wrinkled.

The **BUDS** are of a conic form, placed in the angles of the leaves, and covered with scales which lie over one another like tiles. In apple, pear, plum, apricot, cherry, almond, and peach trees, besides the buds of the leaves, there are scaly buds, or eyes, of a different form, from which proceed bundles or clusters of flowers. *Vide GEMMA.*

The **LEAVES**, which differ in form, being in some genera simple, in others winged, are, in the greater number, placed alternate. Those of medlar, wild service, *spiræa* with marsh-elder leaves, and some others, have their surface covered with small shining spots, which resemble minute points or holes.

The foot-stalk of the leaves is furrowed above, and frequently accompanied, as in the cherry-tree, with a number of knobs in the form of glands.

Most of these plants are furnished with two **STIPULÆ** at the origin of the young foot-stalks of the leaves. These, in some genera, are pretty large; in others they are so small as scarce to be perceived; and in cocoa-plum, in particular, they, by their minuteness, resemble hairs. In apple, prune, cherry, and almond-trees, the appearances in question fall off before the leaves.

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The branches of apple, pear, and medlar trees are terminated by a thorn. The stem of hawthorn and bullace-tree, a species of *prunus*, is closely armed with offensive weapons of the same kind. These spines, however, though protruded from the wood, totally disappear by culture.

The FLOWERS are universally hermaphrodite, except in *spiræa aruncus*, in which male and female flowers are produced upon distinct plants.

In the greater number of genera they are produced in clusters or heads (*corymbi*) at the end of the branches. Many of these flowers are easily rendered double by culture.

The FLOWER-CUP is of one piece with five divisions, which are permanent, and placed above the seed-bud in *spiræa*, apple, pomegranate, service, wild-service, medlar, and currant-trees; in the rest they either fall off with the flower, or wither upon the stalk.

The PETALS are five number, and inserted into the tube of the calyx.

The STAMINA are generally twenty and upwards, and attached, like the petals, to the margin of the tube of the calyx.

The ANTHERS are short, and slightly attached to the filaments.

The SEED-BUD is single, and in those genera which have the calyx permanent, it is placed below the receptacle of the flower.

The SEED-VESSEL is a pulpy fruit of the apple, berry, or cherry kind. Those of the apple kind are divided internally into a number of cells. Pomegranate has nine cells, apple and pear five.

The SEEDS in pomegranate, apple, and currant-trees, are numerous; in service-tree, three; in medlar, five; in wild-service, two; in peach, plum, and cocoa-plum, a single nut, or stone, containing a kernel.

The pulpy fruits of this order of plants are acid, esculent, and of great efficacy in putrid and bilious fevers.

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The kernels of plums, cherries, and almonds, contain a great quantity of oil, and, when bitter, are said to be highly pernicious to certain animals, particularly birds which feed on them. The fruit of the wild apple-tree yields, by expression, an acid juice, which being fermented, becomes an agreeable vinous liquor. Medlars are astringent and diuretic. The flowers of peach-tree are a gentle purgative. The gum of cherry and peach-trees may be substituted for gum-arabic, which, however, is greatly preferable. The wood of bird-cherry is sudorific, yet rarely used in medicine. From bitter almonds is drawn by expression an oil, which is anodyne, and highly proper in deafness, and pains of the ear.

POMIFERÆ, (*pomum*, an apple, and *fero*, to bear) the name of a class in Hermannus, Boerhaave, and Ray's Methods, consisting of plants which have a fleshy fruit of the apple kind. It is exemplified in the pear, and pomegranate-trees.

POMUM, an apple; a species of seed-vessel, composed of a succulent fleshy pulp, in the middle of which is generally found a membranous capsule, with a number of cavities for containing the seeds. Seed-vessels of this kind have no external opening or valve. At the end opposite to the foot-stalk is frequently a small cavity, called by gardeners the eye of the fruit, and by botanists, *umbilicus*, the navel, from its fancied resemblance to the navel in animals. Gourd, cucumber, melon, pomegranate, pear, and apple, furnish instances of the seed-vessel in question.

PRECIÆ, (*precius*, early); the name of the twenty-first order in Linnæus's Fragments of a Natural Method; consisting of primrose, an early flowering-plant, and a few genera which agree with it in habit and structure, though not always in the character or circumstance expressed in the title.

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List of the Genera contained in this Order.

Linnæan Genera.

English Names.

Androsace.

Arctia.

Cortusa, — — Bear's-ear fanicle.

Cyclamen, — — Sow-bread.

Diapensia.

Dodecatheon, — — Meadia.

Primula, — — Primrose, auricula.

*Soldanella,*¹ — — Soldanel.

β Limosella, — — Least water-plantain.

γ Hottonia, — — Water milfoil, or water-violet.

Menyanthes, — — Bog-bean, or marsh-trefoil.

Samolus, — — Round-leaved water-pimpernel.

These plants, which possess no striking uniform characters, are, in general, innocent in their quality; yet the root of sow-bread is dangerous, if taken internally.

PROLIFER *flos*; (*proles*, an offspring, and *fero*, to bear); a prolific flower, or flower which from its own substance produces another; a singular degree of luxuriance, to which full flowers are chiefly incident.

In simple flowers, the proliferation arises from the seed-bud of the parent or full flower shooting up into another flower; in which case, a single foot-stalk only is protruded: in compound and aggregate flowers properly so called, it arises from the common calyx, from all parts of which are sent forth many foot-stalks, each supporting a single flower. Examples of the former mode of luxuriance are frequent in ranunculus, anemone, pink, rose, and herb-bennet: of the latter, in daisy, hawkweed, marigold, and scabious.

Simple umbelliferous flowers become prolific, by the production of another simple umbel from their centre; as in the *Cornus Mesomora* of Rivinus. In milk-parsley, and wild carrot, is protruded from the centre of the compound umbel,

bel, another universal umbel which overtops the former. By a further exertion of the same cause it is easy to conceive that this last umbel may likewise be rendered prolific; and thus a triple crown of heads of flowers be erected, each growing out of the one immediately below it.

Prolific flowers are said to be frondose or leafy, which produce branches charged with both leaves and flowers. Instances of this mode of luxuriance, though rare, are sometimes observed in rose and anemone. In the full flowers of cherry-tree, the seed-bud frequently shoots up by luxuriance into a number of leaves.

PROPAGO, (properly a slip, layer, or cutting of a vine, or other tree; thus Virgil—" *Melius propagine vites respondent.*" Georg. 2. 63.) Linnæus's name for the seeds of the mosses. *Vide* MUSCI.

PUBES, hair, down, a general term; expressive of all the hairy and glandular appearances on the surface of plants, to which they are supposed by naturalists to serve the double purpose of defensive weapons, and vessels of secretion. The different species of *Pubes* enumerated by Linnæus, are,

- I. PILI, hairs:
- II. LANA, wool.
- III. *Barba*; a beard, or tuft of hair.
- IV. TOMENTUM, a hoary, silver-white appearance:
- V. *Strigæ*,
- VI. *Setæ*,
- VII. HAMÆ, hooks.
- VIII. GLANDULÆ, glands:
- IX. *Glochides*, pointed hairs.
- X. *Viscositas*, clamminess.
- XI. *Glutinositas*, stiff clamminess.

Many of these terms it is impossible to define with accuracy, as their differences are so minute, that an adequate idea of the appearances can only be obtained by sight. The more striking kinds of *Pubes*, such as *tomentum*, *glandulæ*, &c. are each particularly explained under its respective head.

In general, it may be observed, that hairs are minute threads,

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threads, of greater or less length and solidity, some of which are visible to the naked eye, whilst others are rendered visible only by the help of glasses. Examined by a microscope, almost all the parts of plants, particularly the young stalks, appear covered with hairs.

Hairs on the surface of plants present themselves under various forms: in the leguminous plants, they are generally cylindric; in the mallow tribe, terminated in a point; in agrimony, shaped like a fish-hook; in nettle, awl-shaped, and jointed; and in some compound flowers with hollow or funnel-shaped florets, they end in two crooked points.

Probable, as some experiments have rendered it, that the hairs on the surface of plants contribute to some organical secretion, their principal use seems to be, to preserve the parts in which they are lodged from the bad effects of violent frictions, from winds, from extremes of heat and cold, and such like external injuries.

M. Guettard, who has established a botanical method from the form, situation, and other circumstances of the hairy and glandular appearances on the surface of plants, has demonstrated, that these appearances are generally constant and uniform in all the plants of the same genus. The same uniformity seems, sometimes, to characterize all the genera of the same natural order.

The different sorts of hairs which form the down upon the surface of plants were imperfectly distinguished by Grew, in 1682, and by Malpighi, in 1686. M. Guettard, just mentioned, was the first who examined the subject, both as a botanist and a philosopher. His observations were published in 1747.

PUBESCENTIA, (*pubes*, hair, down) pubescence, or hairiness; a general term of habit, expressive of every kind of armature, whether offensive or defensive, with which plants are furnished. The term, which is highly improper to be used with such latitude, is omitted in the later editions of Linnæus's works; the terms *pubes* and *arma*, its constituent parts, supplying its place.

PULMONES, the lungs. By this name, Linnæus, in
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assimilating the animal and vegetable kingdoms, has distinguished the leaves, the organs of perspiration, and respiration in plants.

PUTAMINEÆ, (*putamen*, a shell) the name of the twenty-fifth order in Linnæus's Fragments of a Natural Method; consisting of a few genera of plants, allied in habit, whose fleshy seed-vessel, or fruit, is frequently covered with a hard woody shell.

List of the Genera contained in this Order.

Linnæan Genera.			English Names.
<i>Capparis</i> ,	—	—	Caper-bush.
<i>Cleome</i> ,	—	—	Bastard-mustard.
<i>Cratæva</i> ,	—	—	Garlick-pear.
<i>Crescentia</i> ,	—	—	Calabash-tree.
<i>Marcgravia</i> .			
<i>Morisonia</i> .			

Most of these plants are acrid, and penetrating, and yield, by burning, a great quantity of fixed alkali.

With respect to their virtues, they are powerful aperients. The Indians pretend that the fruit of a species of caper-bush, which they call badutca, extinguishes the flames of love.

Ptisans, baths, and fumigations of these plants, are greatly used by the Negroes at Senegal for venereal complaints, palsies, and distempers of the skin. Bastard-mustard is administered in leprosy in the Levant.

In default of the leaves of baobab, the Negroes on the coast of Guinea mix those of garlick pear-tree, which smell very strong, in their ordinary food called couscous.

The flower-buds of caper-bush, preserved with vinegar, furnish the pickle well known by the name of capers.

The fruit called calabash, is of two kinds, the one small and round, the other large and oval. The trees which bear both fruits are as large and spreading as an apple-tree. The fruit, when largest, is about the size of a man's head, and

when carefully cleared of its pulp, capable of holding fifteen pints of water, or other liquid, for which purpose its scooped shell, which is as thin and light as brown paper, is chiefly used by the inhabitants of the West-Indies. At Barbadoes, besides drinking-cups and punch-bowls, there are made of the calabash-shells, spoons, dishes, and other eating utensils for the slaves: the pulp is soft, sour, and unfavoury, and seldom eaten, except by the cattle, in time of drought: the wood, which is hard and smooth, is frequently made into stools, chairs, and other furniture.

The leaves and fruit of *crataeva* smell strongly of garlick; whence the name of garlick pear-tree by which this genus has been distinguished. The fruit, which in one species is smooth, and in the other, prickly, grows to the size of an orange, and has its inside filled with an agreeable pulp, interspersed with small granulated-seeds. The tender buds from the young branches being bruised, and applied as a plaster to any part of the body, will, in time, raise as regular a blister as that occasioned by cantharides.

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RACEMUS, properly signifies a bunch or cluster of grapes. In a scientific sense it is used to signify a mode of flowering, in which, the flowers placed along a common foot-stalk, are furnished with short proper foot-stalks, proceeding as lateral branches from the common flower-stalk. It is exemplified in the vine and currant-tree.

A cluster resembles a spike, in having its flowers placed along the sides of a common foot-stalk, but differs from it in being furnished with proper flower stalks; whereas the flowers of the spike are placed immediately upon the sides of the common foot-stalk, and are seldom produced in such abundance. *Vide SPICA.*

Again, a cluster differs from that mode of flowering termed a corymbus, in the shortness and equal length of its branches or proper flower-stalks, which in those of the corymbus, rise to such a proportionable height, as to form

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an even surface at top; by which means, each lower flower-stalk is considerably longer than that immediately above it. *Vide* CORYMBUS.

RADIATUS *flos.* *Vide* COMPOSITUS *flos.*

RADIATI, the name of the fourteenth class in Tournefort's Method, consisting of 'compound radiated flowers, that is, compound flowers with plain florets in the margin, and hollow florets in the centre. It is exemplified in ground-sel, feverfew, milfoil, marigold, and daisy.

RADICATIO, (*radix*, a root) a term of habit, expressive of the form and disposition of the root. *Vide* BULBUS and RADIX.

RADICULA, (diminutive from *radix*, a root) a little root: the stringy or fibrous part of the root, which generally terminates the stock or main root, and penetrating into the soil, attracts moisture and nourishment for the support of the vegetable. The radicle is, in fact, the principal and essential part of every root, and is therefore never wanting, not even in those plants improperly styled imperfect: for the mosses, lichens, and submarine plants, discover a remarkable analogy in the *lamellæ* and *striae*, by which they adhere to the bodies placed under them, to the radicles, or stringy fibres, which are present in other plants.

RADIUS. *Vide* COMPOSITUS *flos.*

RADIX, the root; the lower part of the plant, generally hid below the surface of the earth, and destined for attracting the moisture from the soil, and communicating it to the other parts, *viz.* the herb and the fructification which are produced from it.

The root consists of two parts; the *caudex*, stock, or main root, and the *radicula*, or small stringy roots, depending from the other. *Vide* CAUDEX and RADICULA.

Main roots, with respect to form, are of three kinds; bulbous, tuberous, and fibrous. The first sort has been fully considered under the head BULBUS.

Tuberous or knobbed roots, are fleshy, solid, hard, commonly thicker than the base of the stem, and composed either of one knob, as in radish, turnip, and carrot; or, of

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many collected into a bunch, as in pœony, sun-flower, and drop-wort : in the last of which plants, several small roundish bodies hang, or are fastened together by a number of slender strings, or filaments.

In tuberous roots, the radicles or small stringy roots are generally dispersed over the whole surface : in which respect, they differ essentially from bulbous roots, in which the radicles are confined to the bottom of the bulb, that part only being the genuine root ; the bulb itself serving as a large bud under ground, for inclosing and protecting the embryo plant.

The roots of arum, orchis, moschatelline, and some other plants, although tuberous, emit fibres at the top, from a knot formed berwixt the trunk and the thicker part of the root. Such roots, from the fibres which adhere to the top of the fleshy mass resembling a bush of hair, have been distinguished by the name of *radices comosæ*.

Fibrous roots are slenderer than the base of the trunk, and are either divided by equal branches, as in the greater number of trees, in which, likewise, the substance is woody ; or consist of a number of single fibres like hairs, which proceed from the small knot, or base of the stem, as in many grasses. This last kind of fibrous root is termed *radix capillacea*.

With respect to direction, roots are said to be perpendicular, which run directly downwards. The term is most commonly applied to a particular kind of root, which, not exceeding in dimension the basis of the stem, descends perpendicularly downwards in one straight fibre that is thicker in the upper part, and gradually tapers downwards. It is exemplified in carrot, parsnep, radish, and such like roots, which, from their tapering shape, have properly enough obtained the name of *radices fusiformes*, or spindle-shaped roots.

Spindle-shaped roots are a species of tuberous root, as appears from the situation of the strings or fibres, which are dispersed over the whole surface of the stock or principal root, and divided into numerous branches, which, after several subdivisions, become as fine as hairs. This kind of
tapering

tapering root is frequently changed by culture into a round, knobbed, or tuberous root properly so called, as in some umbelliferous plants.

Horizontal, level, or transverse roots, extend themselves horizontally under the surface of the ground; as in iris, masterwort, hop, bishop's weed, cinquefoil, and all such as properly creep.

Of horizontal roots, some run very near the turf, as woodbine and wild anemone: others lower down, as couch-grass.

Of perpendicular roots, some strike down but a little way, as thorn-apple: others pierce deep, as horse-radish.

The direction of roots is also sometimes compounded. Thus, the main root or stock of primrose, is level; the radicles, or strings, run perpendicular.

With respect to division, roots are entire, as liquorice, or parted, as St. John's wort, forked or parted at the bottom, as in most roots, or at the top, as in dandelion, and some others.

The roots in radish are straight: in bistort, crooked; in rhubarb, thick; in vine, slender; long, in fennel; short, in turnip; in eryngo, cylindrical; in borage, pyramidal. Some are uneven and pitted, as potatoes, where the eyes, or buds of the future trunk, lie inward; or knotty, as Jerusalem artichoke, where they stand out.

Roots, in point of duration, are either annual, biennial, or perennial; that is, of one, two, or many years continuance: the two first are attributes of herbaceous vegetables only; the latter, is applicable both to herbs and trees. In some plants, both root and stem subsist for many years. Of this kind are all trees; the roots of which may be termed, by way of distinction, *radices fruticosæ*. In others, the roots only subsist during the winter, whilst the stalks, which decay and perish, are annually renewed from the root. Of this kind, are all those herbs, from this circumstance termed perennial. Biennials renew their stalk only twice; annuals exist but for a year, at the end of which time, both stem

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and root perish, and the individual is at an end. These last as is evident, can only be propagated from seed.

Uniform and constant as Nature is in all her productions, there are many perennial roots which become annual, when transplanted into cold climates. Nay, there are not wanting examples of shrubs losing their stems annually in such climates, in the same manner as the stalks of herbaceous vegetables perish in autumn, whilst the root continues in full vigour: sometimes even, in such circumstances, the shrub not only divests itself of its woody stem, and becomes herbaceous, but is metamorphosed, in every respect, into an annual plant, and loses both its stem and root at the end of one year. (*Vide Methodus.*) Culture, on the other hand, may prolong the life of annuals. Thus, M. Duhamel mentions a root of barley, which put forth new stalks after the old ones were cut down in harvest, and produced a spike of flowers the following year.

Among the accidents that happen to roots from an excess of culture, or a luxuriance of nourishment, may be reckoned the monstrous appearance of the roots of some potatoes, which, although generally six inches long, and three broad, are sometimes found eighteen inches, and two feet long, and one foot in diameter. Those of turnip, in like manner, are sometimes found increased to the enormous size of nine or ten inches in diameter, although, in general, they seldom exceed three or four.

Roots, as we observed in the definition, are generally hid below the surface of the ground, and derive their nourishment immediately from the soil. This is a general law of vegetable nature, but like most other general laws, admits of exceptions. The roots of mistletoe, vanelloe, dodder, *hypocistis*, and some others, do not penetrate into the soil, and seek nourishment for themselves, but derive it, as by stealth, from other plants, to which they attach themselves. Such plants, from the singular circumstance just mentioned, are termed parasitic.

Mistletoe and vanelloe cling to the branches of trees, *hypocistis*

cistus to the roots of plants, particularly of *cistus*, or the rock-rose, whence it derives its name : dodder, to the stems of all sorts of plants, though it is generally known by the name of *epithymum*, or thyme-weed, as if it were only to be found on the plant of that name.

The manner in which parasitic plants attach themselves to others, is not uniform. The seed of dodder germinates in the ground, and puts forth a stem, which attaches itself to the first plant it encounters in its progress. From this plant it attracts the nourishing juices, by means of certain secretory glands with which the stem is furnished. Mean time, the lower part of the stem, which is detached from the supporting plant, and receives no part of the nourishment, dries up ; its first root dies, and the plant continues to live and be nourished at the expence of that upon which it is fixed.

On the other hand, mistletoe, vanelloe, and *hypocistis*, are produced originally upon the plant which affords them nourishment : the two former, which grow upon large trees, extend their roots under the bark, and penetrate insensibly into the body of the wood.

Other parasitical plants, consisting of small tubercles, emit fibrous roots, which often penetrate the bulbs of saffron, extract all the substance, and hence occasion the sudden death of the parent or supporting plant.

Some roots attach themselves to the hardest bodies, as the mosses to the bark of trees, the lichens to stones and rocks, nourished, without doubt, by the humidity of the air absorbed by their leaves, or branches. Other plants swim upon the surface of the water, as *lemna*, or duck's meat, which grows upon standing waters in most parts of England, and, if not disturbed, will soon cover the whole surface. Some plants appear to be totally devoid of roots ; such are many of the *Algae*, particularly the genera *Byffus* and *Tremella*.

In assimilating the animal and vegetable kingdoms, Linnaeus, properly enough, compares the root in plants to the lacteal vessels in animals. The soil, or earth, is the vegetable stomach ; the trunk, its bones ; the leaves, its lungs ;
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and heat its heart : analogies, which probably suggested the epithet of *inverted animal*, so frequently bestowed upon plants by the ancient naturalists.

RECEPTACULUM, (properly, a place to receive or keep things in) one of the seven parts of fructification, defined by Linnæus to be the base which connects or supports the other parts. The different species of receptacle enumerated by Linnæus are these :

I. A **PROPER RECEPTACLE**, which supports the parts of a single fructification. Of this kind is the receptacle of all simple flowers.

II. A **COMMON RECEPTACLE**, which is common to an aggregate or head of flowers. Of this kind is the receptacle of compound and other aggregate flowers. *Vide AGGREGATUS flos.*

III. **Umbella.** } These two would have been more properly denominated **MODES of FLOWERING,**

IV. **Cyma.**

V. **Spadix.**

The first of these receptacles only falls to be considered in this place. The second, which admits of the greatest number of varieties, and is chiefly employed in discriminating the genera of compound flowers, will naturally enter into the description of that numerous and difficult class of plants. The other three, to which the name of receptacle seems totally misapplied, are sufficiently explained, each under its respective head.

A proper receptacle obtains different names from the parts of the fructification which it supports and connects. When both flower and fruit are supported by it, it is generally stiled the receptacle of the fructification, and not seldom the common receptacle. This last term, though somewhat improper, I have generally adopted in describing several natural orders of simple flowers that occur in the course of this work. Again, when the receptacle supports the parts of the flower only, it is called the receptacle of the flower. In such cases, the seed-bud or fruit, which is placed below the receptacle of the flower, has a proper base of its own, which is distinguished by the name of receptacle of the fruit.

fruit. Of this French-willow and tree-primrose furnish examples.

In some simple flowers which have the seed-bud placed above the receptacle of the flower, the fruit has a separate receptacle. This observation is particularly exemplified in magnolia, tulip-tree, custard-apple, and the other genera of the natural order *coadunatæ*, in which the numerous seed-buds are seated upon a receptacle, which rises like a pillar above the receptacle of the flower. *Vide COADUNATÆ.*

Again, The term receptacle is often used to signify the base to which the seeds are fastened within their inclosure or vessel. Instances of the application of this term are furnished by deadly night-shade, winter-cherry, hen-bane, tobacco, thorn-apple, mullein, and many other plants. This sort of receptacle is commonly known among botanists by the name of *placenta*, from its being the common receptacle of the umbilical vessels, which serve to transmit the nourishment to the seeds.

RESUPINATIO. *Vide INTORSIO.*

RHŒADEÆ, (*rhœas*, Linnæus's name, after Dioscorides, for the red poppy) the name of the twenty-seventh order in Linnæus's Fragments of a Natural Method, consisting of poppy, and a few genera which resemble it in habit and structure.

List of Genera contained in this Natural Order.

Linnæan Genera.	English Names.
<i>Argemone</i> , —	Prickly poppy.
<i>Bocconia</i> .	
<i>Chelidonium</i> , —	Celandine.
<i>Papaver</i> , —	Poppy.
<i>Podophyllum</i> , —	Duck's-foot, or May apple.
<i>Sanguinaria</i> , —	Puccoon.

These plants, upon being cut, emit plentifully a juice, which is white in poppy, and yellow in the others. From the

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the inspissated juice of the heads and leaves of black poppy, is prepared the extract well known by the name of opium. The taste of these plants is, in general, acrid and bitter; the petals of poppy are somewhat sweet.

With respect to their virtues, they seem to operate principally upon the nerves. Their juice is sordid and narcotic, their seeds less so, their roots aperient. Applied externally, they are slightly corrosive.

A decoction of the roots of prickly poppy is much used by the Negroes of Senegal in the early stages of the venereal disease. The juice of celandine applied externally has the same effect as that of common fumatory, to destroy warts, and cutaneous eruptions. Mixed with a very great quantity of water, it is successfully employed as a lotion in weakness of sight, and pains of the eyes. The leaves of wild poppy are put into cooling ointments, being accounted proper for burnings, inflammations, and hot swellings.

With the juice of puccoon, the Indians of North-America, where the plant naturally grows, paint themselves of a yellow colour.

ROSACEI, (*rosa*, a rose) the name of the sixth and twenty-first classes in Tournefort's method, consisting of herbs and trees with simple flowers, having an indeterminate number of regular petals placed circularly like those of the rose. The term is exemplified in amaranthus, purslain, poppy, passion-flower and chick-weed.

ROSTELLUM (diminutive from *rostrum*, a beak) a little bell, beak, or snout; the scaly part of the *corculum*, or embryo of the seed, which shoots downward into the soil, and becomes the root; its form is that of a small beak placed without the lobes, and adhering internally to the *plumula*, or embryo stem. The term is classical, and as old as Columella.

ROTACEÆ, (*rota*, a wheel) the name of the twentieth order in Linnæus's Fragments of a Natural Method, consisting of plants with one flat wheel-shaped petal, (*corolla rotata*). *Vide* COROLLA.

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List of the Genera contained in this Order.

Linnæan Genera.		English Names.
α	<i>Anagallis</i> , —	— Pimpernel.
	<i>Centunculus</i> .	
	<i>Chironia</i> .	
	<i>Exacum</i> .	
	<i>Gentiana</i> , —	— Gentian, or fell-wort.
	<i>Lyfimachia</i> , —	— Loose-strife.
	<i>Phlox</i> , —	— Lychnidea, or bastard lychnis.
	<i>Sarothra</i> , —	— Bastard-gentian.
	<i>Swertia</i> , —	— Marsh-gentian.
	<i>Trientalis</i> , —	— Winter-green with chick-weed-flowers.
β	<i>Ascyrum</i> , —	— St. Peter's wort.
	<i>Cistus</i> , —	— Rock-rose.
	<i>Hypericum</i> , —	— St. John's wort.

The three last genera are very improperly annexed to this order, and indeed, few of the other genera can be said, in strict propriety, to possess the character specified in the title.

These plants resemble in quality those of the order PRECIÆ, to which they are in all respects very nearly allied.

The root of greater yellow gentian, the *gentiana lutea* of Linnæus, is a well known stomachic, and makes a principal ingredient in bitters. The plant grows naturally in the mountainous parts of Germany, from whence the roots are brought to England for medicinal purposes. The roots only are used. Lesser centaury of the shops, the *gentiana centaurium* of Linnæus, possesses an operative cleansing faculty, removes obstructions, strengthens the stomach, and destroys worms. Outwardly, it is used in fomentations against swellings and inflammations.

Gum labdanum is an odoriferous balsam or resin which is found upon a species of rock-rose, the *cistus ladanifera* of Linnæus, that grows naturally in the Levant. This substance,

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stance, which the natives collect by means of leather thongs, rubbed gently over the surface of the shrub which produces it, is of a very balsamic nature, and used in medicine both internally and externally.

From a species of *Hypericum*, the natives of Louisiana; we are informed by Bossu, extract an oil that proves an excellent vulnerary. The following is the Indian method of making it. In an earthen pot they put a proper quantity of the flowers, and some bear's oil above it. The pot or vase is then well stopped, and exposed to the morning sun, the heat of which, concentrated in the vase, imparts to the inclosed substance, which turns red, and has a very agreeable smell, the quality of purifying and curing all sorts of wounds.

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SAPOR, taste. An attribute or quality in plants, depending upon an external sense, and, therefore, apparently different even in the same individual, according to the state of the organ, which is probably affected by every change of habit in the human body.

The ancients, particularly Aristotle, and Theophrastus, enumerate only seven primitive tastes ; these are,

I. Sweet.

II. Fat.

III. Acid.

IV. Acrid.

V. Austere, or harsh.

VI. Acerb.

VII. Salt, and bitter. These last are by Theophrastus confounded.

To these seven primitive tastes of Aristotle and Theophrastus, Pliny has added the following six, which, however, appear to be rather intermediate steps of those already enumerated than simple tastes.

VIII. Agreeable (*suavis*) a mode of sweet.

IX. Poignant,

IX. Poignant, or tart (*acutus*) a less degree of *acid*.

X. Bitter (*amarus*) a simple taste, confounded by the Greek naturalist, as was observed above, with a *salt* taste.

XI. Vinous, a composition, according to Pliny, of *sweet*, *agreeable*, *poignant*, and *austere*.

XII. Milky taste, composed of *agreeable* and *fat*.

XIII. Watery, which is almost insipid.

The school of Salernum distinguished nine simple tastes, which they characterized by their different temperaments, as follows :

I. Acrid, bitter, and alkaline salt. WARM.

II. Watery or insipid, sweet, and fat. TEMPERATE.

III. Acid, harsh, or acerb, and acid salt. COLD.

The moderns by distinguishing austere from acerb, adding some things, and retrenching others, have increased the number of simple tastes to ten ; which stand thus opposed to each other.

I. Insipid or watery	} opposed to {	VI. Acid, or alkaline salt.
II. Sweet		VII. Acrid.
III. Fat		VIII. Austere.
IV. Viscous		IX. Acerb.
V. Acid		X. Bitter.

Tastes are distinguished by their quantum of force or intensity into steps or degrees, which are likewise, sometimes, by writers on the *Materia Medica*, used for expressing the different temperaments of those tastes. Thus the simple taste bitter, has been divided into ten degrees ; and we say, that the root of turmeric is bitter in the first or lowest degree ; the seed of blue clematis in the tenth or highest. In the same manner, as a bitter taste indicates a warm temperament, other degrees or divisions arise from the intensity of warmth in the instances in question : and we say, that one is warm in such a degree, and the other in a different. Some tastes affect the organ of sensation sooner than others which are of a greater degree of intensity. Acid and bitter tastes, as vinegar and wormwood, are soon felt, and quickly gone. Acrid tastes are not felt so soon, and last longer. Thus the sharpness of the seeds of clematis, although in the tenth degree,

gree, is not so quickly perceived, as the bitterness of roses; although only in the second degree: Hot tastes are slower in affecting the organ of sense, and last longer than others. Thus the bitterness of the roots of black hellebore, which is in the second degree, is perceived on the slightest contact; but its heat, though in the third or fourth degree, is not felt till after two minutes; in like manner, the bitterness of elecampane, although only in the fourth degree, is sooner felt than its heat, which is in the eighth.

The climax which is observed in the perception of tastes, during its continuance, is different in different objects. The heat of galangal causes, at first, a slight sensation, but it is not till the end of one minute that its greatest force is perceived. Black hellebore does not attain its highest sensation till four minutes after its first contact.

The duration of the greatest force of the sensation is, likewise, different, as the substances differ; thus the heat of black hellebore comes to its greatest intensity and diminishes in one minute; that of the root of garden cress in the same time; that of the root of asarabacca, in two minutes.

The leaves of milfoil, which are bitter in the fourth degree, and warm in the first, lose, at first, their bitterness, whilst their heat still continues. Acorus, or sweet rush, is hot in the first degree, aromatic in the third, and bitter in the fourth; yet its bitterness is presently extinguished; its heat lasts two minutes, and its aromatic sensation seven or eight. The heat of garden-cress endures seven or eight minutes; the bitterness of elaterium a quarter of an hour; the heat of euphorbium and black hellebore half an hour; the acrid sensation occasioned by the root of arum, or cuckow-pint, often lasts twelve hours. From these familiar examples it appears, that the sensation acquires its greatest force, in four or six minutes at most, from the time of contact; its duration in its decrease is often thirty or forty minutes and upwards.

Tastes, considered with relation to the parts which they affect, are either, 1, fixed and local; 2, extend themselves to the parts in the neighbourhood of that which is first affected, without,

without, however, relinquishing their former station; as the bitterness of the dried roots of black hellebore, which spreads from the end of the tongue to its middle, and that of the leaves of elaterium, which spreads from the tip of the tongue to its root; or, 3, are translated from one part to another, as in the roots of gentian, the bitterness of which soon relinquishes the tip of the tongue, the part first affected, and transfers itself to the middle.

Sapid bodies affect differently the parts which they touch, as the lips, tongue, palate, throat, and gullet.

The lips are affected more strongly by the heat of the root of white hellebore, than any of the other parts.

The tip of the tongue is affected by most plants; gentian and colocynth affect chiefly the middle, the leaves of elaterium, the root.

The palate is affected by the root of deadly night shade; its impression lasts four minutes.

The throat is more affected than the other parts by the roots of mercury, asparagus, and jalap.

The œsophagus or gullet is particularly affected with heat, by the roots of wormwood. The leaves make no impression of this kind, on which account they are not so stomachic as the roots.

As the taste of the same individual undergoes seeming alterations, according to the perfect or morbid state of the external organ; so different individuals of the same species are liable to real variations from climate, soil and culture. Apples and pears, which grow naturally in the woods, are extremely harsh and acid; wild succory is bitter; wild lettuce disagreeable. Culture renders them all sweet and esculent, and moreover produces such variety in the article of taste, that of 172 distinct kinds of pears, and 200 of apples, enumerated by authors, each kind has a peculiar taste.

All the parts of a plant have not the same taste; in some, the fruit has an acid and agreeable taste, whilst the leaves or roots are bitter and disagreeable; in others, the reverse of this happens. It is for this reason that plants can never be properly arranged by their sensible qualities; the different

parts of the same plant possessing different qualities, must necessarily be disjoined and arranged under separate articles.

The above observations on the variable nature of taste, sufficiently evince the necessity of excluding it from the list of genuine specific differences. The following names, therefore, which are to be met with in authors, and others of the like kind, are totally to be rejected.

Apium ingratius (disagreeable)

——— *dulce* (sweet)

Lactuca opij succo virgoso (harsh like opium)

——— *mitis* (mild)

Pyrus fructu saccharato ore deliquescente (sweet like sugar, and melting in the mouth).

All plants act either by their smell upon the nerves, by their taste upon the muscular fibres, or by both upon the fluids. Sapid bodies never act upon the nerves, nor odoriferous bodies upon the muscular fibres. The former act upon the fluids and solids, and change the fluids, which are evacuated by both sapid and odoriferous substances.

The virtues and qualities of plants are commonly indicated by their taste, smell, and colour.

Insipid plants and such as have no smell, have rarely any medicinal virtue.

Sapid and odoriferous plants, on the contrary, always possess very strong powers. In fact, to deprive a plant of its taste and smell, is to rob it of its virtue, as is evident from the change effected in the *fæculæ* and extracts of arum, calla, cassada, and elaterium.

Sweet-smelling plants are generally of innocent quality; such as are nauseous, and of a rank, heavy, disagreeable smell, are noxious.

The plants of the following list are striking examples of the latter. Many mushrooms, elder, herb-christopher, aconite, hellebore, asarabacca, stinking bean-trefoil, thorn-apple, tobacco, henbane, coloquintida, and hounds-tongue.

SARMENTACEÆ (*sarmentum*, the twig, shoot, or spray of a vine); the name of the eleventh class in Linnæus's
Fragments

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Fragments of a Natural Method, consisting of plants which have climbing stems and branches, that, like the vine, attach themselves to the bodies in their neighbourhood for the purpose of support.

List of the Genera contained in this Order.

Linnæan Genera.		English Names.
<i>Alstrœmeria.</i>		
<i>Aristolochia,</i>	—	— Birthwort.
<i>Asarum,</i>	—	— Asarabacca.
<i>Asparagus,</i>	—	— Asparagus, by corruption Sparrow-grafs.
<i>Centella.</i>		
<i>Cissampelos.</i>		
<i>Convallaria,</i>	—	— Lily of the valley.
<i>Cytinus.</i>		
<i>Dioscorea.</i>		
<i>Erythronium,</i>	—	— Dog's tooth violet.
<i>Gloriosa,</i>	—	— Superb lily.
<i>Medeola,</i>	—	— Climbing African asparagus.
<i>Menispermum,</i>	—	— Moon-feed.
<i>Paris,</i>	—	— True-love, or one-berry.
<i>Rajania.</i>		
<i>Ruscus,</i>	—	— Butcher's broom, or knee-holly.
<i>Smilax,</i>	—	— Rough bind-weed.
<i>Tamus,</i>	—	— Black bryony.
<i>Trillium,</i>	—	— Three leaved night-shade, or herb true-love of Canada.
<i>Uvularia.</i>		

These plants are far from being a true natural assemblage. In fact, they agree in scarce a single circumstance, save that expressed in the title, which is far from being peculiar to this order.

The pounded root of *cissampelos*, the caapeba of Plumier, applied

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applied externally, is said to be an antidote against the bites of venomous serpents. The plant being infused in water, quickly fills the liquor with a mucilaginous substance, which is as thick as jelly; whence the name of freezing-wyth, by which this genus of plants has been distinguished by the Braſilians.

The powdered root of a Mexican species of birth-wort, the *Aristolochia anguicida* of Linnæus, proves, according to Dr. Jacquin, an infallible remedy against snakes; those pernicious animals being actually fascinated and even killed by it. In Carthagera, the Indians chew the root of this plant, and mix its juice with the saliva. If one drop of this mixture is put into the snake's mouth, it becomes intoxicated, and you may handle it with perfect impunity; if two or three drops are forced in, and they reach the stomach of the reptile, convulsions instantly follow, and it dies. The Indian, who shewed Dr. Jacquin this method, informed him likewise, that he himself had been thrice bitten by snakes, and had at each time cured the wound by the application both internal and external of *Aristolochia*. The plant itself has so nauseous a smell, that it is always avoided by snakes, and, when chewed, causes vomiting even to men.

It seems highly probable that it is of this species of *Aristolochia*, that Bossa, in his travels through Louisiana, relates the following curious fact. " During my voyage to Tombekbé, a *whistler-snake*, (so termed from its having a prodigious wide mouth, and when angry, whistling at a terrible rate) which lay concealed under some leaves, bit a soldier of my detachment, who trod upon its tail. The soldier was barefoot, and the snake so irritated, that it got hold of his big toe, which it obstinately held fast. I was very uneasy and sorry to see this soldier, who was my interpreter, exposed to perish; and, as an Indian doctor just then accidentally passed by the place where we were, I applied to him for advice. He took a powder out of a little sack, and blew it through a tube upon the snake's head, which died instantly. He put another powder upon the wound, which prevented the poison from taking effect, giving some of it in

water

water at the same time to the patient, who was quite well in a moment. This Charlatan, continues Bossu, I recompensed very handsomely, and wished to know his secret, but in vain. He resisted every importunity to that effect, telling me haughtily, and in the true stile and manner of the juggler, that the Master of life, who had communicated the art to him alone, would not permit it to be imparted to another."—Bossu, *Louisiane*, Tom. I.

Yams, the root of the *dioscorea bulbifera* of Linnæus, are the principal food of the Negroes in the West-Indies. The skin is pretty thick, rough, unequal, covered with many stringy fibres, and of a violet colour approaching to black. The inside is white, and of the consistence of red beet; it resembles potatoes in its mealiness, but is of closer texture.

When raw, these roots are viscous or clammy; when boiled or roasted, they afford very nourishing food, and are often preferred to bread by the inhabitants of the West-Indies, on account of their lightness and facility of digestion. The stem of the plant is square: when placed by itself, it trails upon the ground, and strikes root at proper distances; but when planted in the neighbourhood of bushes or trees, it avails itself of their support, climbs, and in a short time, covers every place to which it can penetrate. The leaves are opposite, and shaped like a heart; they are of a dark green, pretty thick and succulent. The flowers, which are small and bell-shaped, grow in spikes from the wings of the leaves, and are succeeded by dry capsular fruits, each containing several small, flat, black seeds. The plant, which is a native of Africa and the East-Indies, is propagated by the eyes of the root, in the same manner as potatoes and Jerusalem artichoke. When first dug out of the ground, the roots are placed in the sun to dry; after which, they are either put into sand, dry garrets, or casks, where, if kept from moisture, they may be preserved whole years, without being spoilt, or diminished in their goodness. Two or three pounds is the common weight of this root; some yams, however, weigh twenty pounds and upwards.

In Siberia, says Gmelin, they dry and mix with their

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soups, in spring, the root of dog's-tooth-violet, which grows in great abundance in that country, and is termed by the Siberians, besfs.

The feeds of a Levant species of moon-feed, being formed into a paste, are regarded, by the inhabitants, as a genuine specific against lice, and eruptions of the skin. The same paste is used for the purpose of intoxicating fishes, which thus become an easy prey to the first invader.

SCABRIDÆ (*scaber*, rough, rugged, bristly) the name of the fifty-third order in Linnæus's Fragments of a Natural Method, consisting of plants with rough leaves. There is an impropriety in characterizing these plants by a name expressive of the roughness of the leaves, as that circumstance had previously furnished the classic character of the forty-first order, ASPERIFOLIÆ.

The degree of roughness, however, is much greater in the plants which make the subject of the present article.

List of the Genera contained in this Order.

Linnæan Genera.		English Names.
<i>Acnida.</i>		
<i>Bosœa,</i>	—	—
		Yerva-mora, or golden-rod tree.
<i>Cannabis,</i>	—	—
		Hemp.
<i>Cecropia.</i>		
<i>Celtis,</i>	—	—
		Nettle-tree.
<i>Dorstenia,</i>	—	—
		Contrainerva.
<i>Ficus,</i>	—	—
		Fig.
<i>Humulus,</i>	—	—
		Hop.
<i>Morus,</i>	—	—
		Mulberry-tree.
<i>Parietaria,</i>	—	—
		Pellitory.
<i>Theligonum,</i>	—	—
		Dog's-cabbage,
<i>Ulmus,</i>	—	—
		Elm-tree
<i>Urtica,</i>	—	—
		Nettle.

contrayerva or counterpoison of the Spaniards. The name has been, at different times, given to many different roots, supposed to possess the virtue of resisting both internal and external poisons. With us, the root is in great estimation in fevers that can be relieved by encreasing the discharges through the pores of the skin, and for throwing out the small pox. The root of all the species is likewise used in dyeing.

A decoction of the old wood of a species of mulberry, called tataiba by the Brasilians, dyes a fine yellow colour. The leaves of some species are the common food of silk worms.

SCAPUS, (properly the shaft of a pillar—ἀ σκηπτω, innitor,) an herbaceous stem so called, which elevates the fructification, but not the leaves: in other words, a naked stalk, proceeding immediately from the root, and terminated by the flowers; as in narcissus, lily of the valley, hyacinth, and winter-green. This species of trunk differs from a flower-stalk, (*pedunculus*) in that the latter issues, not from the root, but from the stem, or branches; and from a naked stem, (*caulis aphyllus*) in that the *scapus*, though it elevates no leaves, has always radical or bottom leaves; whereas, a naked stem is devoid of leaves altogether.

This sort of universal trunk generally prevails through all the species of the same genus, and hence, can be but seldom used as a discriminating character. Two species of winter-green with a triangular stalk of this kind, are distinguished by that circumstance from the other species. In the *Species Plantarum*, the term *scapus* is generally preceded by the superfluous word *naked*; an addition which is apt to mislead the unexperienced botanist, as seeming to imply, that nakedness is not an essential part of the description of this species of stalk.

SCITAMINEÆ, (*scitamentum*, *scitum edulium*, a dainty, meat of an agreeable taste) the name of the eighth order in Linnæus's Fragments of a Natural Method, consisting of the following beautiful exotic plants, some of which, as
banana,

Banana, furnish exquisite fruits; and others have an agreeable aromatic flavour.

List of the Genera contained in this Order.

Linnæan Genera,	English Names.	
<i>Alpinia.</i>		
<i>Annonum,</i>	—	— Ginger.
<i>Canna,</i>	—	— Indian flowering-reed,
<i>Costus.</i>		
<i>Curcuma,</i>	—	— Turmeric.
<i>Kæmpferia.</i>		
<i>Maranta,</i>	—	— Indian arrow-root.
<i>Musa,</i>	—	— Banana, plantain-tree.
<i>Thalia.</i>		

These plants are all natives of very warm countries; and, notwithstanding their great height, are only perennial by their roots.

The plants of this order which have only one filament, or male organ, (as ginger, costus, Indian flowering-reed, alpinia, and Indian arrow-root) have, in all their parts, an aromatic odour, and an acrid, or poignant taste; qualities, however, possessed in a much greater degree by the roots, which are hot, and resinous. The fruit of the different species of plantain-tree (*musa*) is acid.

The confectioned roots of most of the aromatics of this order are greatly in use; and their leaves, particularly those of wild ginger, and of a species of turmeric called vanhom by the Japanese, furnish excellent pot-herbs. The internal use of these plants removes obstructions, resists poison, and is of considerable efficacy in gouty and asthmatic complaints. The stalks of *costus* chewed are useful in slight stages of the venereal disease. Their leaves, applied externally, give ease in violent colics; they likewise strengthen the eyes.

The fruit of the banana-tree is of the size and shape of a middling cucumber, and of a high, grateful flavour. The leaves are two yards long, and a foot broad in the middle; they

they join to the top of the body of the tree, and frequently contain in their cavities a great quantity of water, which runs out, upon a small incision being made into the tree, at the junction of the leaves. Bananas grow in great bunches, that weigh a dozen pounds and upwards. The body of the tree is so porous, as not to merit the name of wood. The tree is only perennial by its roots, and dies down to the ground every autumn,

When the natives of the West-Indies, says Labat, undertake a voyage, they make provision of a paste of banana, which, in case of need, serves them for nourishment and drink. For this purpose, they take ripe bananas, and having squeezed them through a fine sieve, form the solid fruit into small loaves, which are dried in the sun, or in hot ashes, after being previously wrapped up in the leaves of Indian flowering-reed. When they would make use of this paste, they dissolve it in water, which is very easily done, and the liquor, thereby rendered thick, has an agreeable acid taste imparted to it, which makes it both refreshing and nourishing.

The banana is greatly esteemed and even venerated by the natives of Madeira, who term it the forbidden fruit, and reckon it a crime almost inexpiable to cut it with a knife; because, after dissection, it exhibits, as they pretend, a similitude of our Saviour's crucifixion; and to cut the fruit open with a knife, is, in their apprehension, to wound his sacred image.

Some authors have imagined, that the banana-tree was that of the leaves of which our first parents made themselves aprons in Paradise. The sacred text, indeed, calls the leaves employed for that purpose, fig-leaves; and Milton, in a most beautiful, but erroneous description, supposes the Malabar, or Decan fig, to have been the tree alluded to. But, besides that the fruit of the banana is often, by the most ancient authors, called a fig, its leaves, by reason of their great size and solidity, were much better adapted for a covering, than those of the fig-tree just mentioned, which are seldom above six or eight inches long, and three broad.

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On the other hand, the banana leaves being three, four and five feet long, and proportionably broad, could not fail to be pitched upon, in preference to all others; especially as they might be easily connected, by means of the numerous stringy filaments that may be peeled with the utmost facility from the body of this tree.

Indian arrow-root is the only remedy yet known against wounds made by arrows poisoned with the milky juice of the manchineel-tree. The natives of the Caribbee Islands, where it naturally grows, call it *toulola*. It resembles Indian flowering-reed, except in its height, which seldom exceeds four feet. The flower is white, and succeeded by a fruit with three sides like a prism, of a pale red, and very sleek, containing a small, wrinkled, or furrowed seed. The root is a long, white, jointed, watery, and mealy bulb, from which hang a great number of long dry fibres. The leaves are strong, almost as firm as parchment, of a light green, curl themselves as soon as gathered, and are attached to the trunk by a long furrowed stalk; they are round below, four times longer than broad, and end in a point, like the extremity of a spear or halberd. The root is pounded, infused in water, and made into ptisan, which is drunk by those who have been wounded with poisoned arrows. It has the virtue of dissipating the *virus*, and of preventing it from reaching the noble parts. The same root bruised, and made into a cataplasm, is applied externally to the wound, and with great efficacy, if quickly used; but if delayed, though for a very short time, the poison gains ground, corrupts the parts adjoining to the wound, and having communicated its virulence to the larger vessels, proves mortal. Of the root of this plant is likewise made an exceeding fine starch, far surpassing that made with wheat.

SECTIO. *Vide* ORDO.

SEMEN, the seed; the essence of the fruit of every vegetable; defined by Linnæus to be a deciduous part of the plant, containing the rudiments of a new vegetable, and fertilized by the sprinkling of the male dust. The parts of a
seed

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seed properly so called enumerated by Linnæus, are as follows:

- I. CORCULUM, the *punctum vitæ*, or essence of the seed.
- II. COTYLEDONES, the lobes.
- III. HILUM, a mark or scar in the seed.
- IV. ARILLUS, Lin. the proper covering: *calyptra* of Tournefort.
- V. CORONULA, }
PAPPUS, } the crown of the seed.
- VI. ALA, the wing of the seed.

Each of these terms is particularly explained under its proper head.

Besides the seed properly so called, two other terms are referred by Linnæus to the general article of SEMEN: these are,

- VII. NUX, a nut, or seed covered with a hard bony skin.
- VIII. PROPAGO, the seed of the mosses.

With respect to number, plants are either furnished with one seed, as sea-pink, and bistort; two, as wood-roof, and the umbelliferous plants; three, as spurge; four, as the lipped flowers of Tournefort, and rough-leaved plants of Ray; or many, as ranunculus, anemone, and poppy.

The form of seeds is likewise extremely various, being either large or small, round, oval, heart-shaped, kidney-shaped, angular, prickly, rough, hairy, wrinkled, sleek, or shining, black, white, or brown. Most seeds have only one cell, or internal cavity; those of lesser burdock, valerian, lamb's lettuce, cornelian-cherry, and scabiosa, have two.

With respect to substance, seeds are either soft, membranaceous, or of a hard bony substance. This last is exemplified in gromwell, tamarind, and all the nuciferous plants.

In point of magnitude, seeds are either very large, as in cocoa-nut; or very small, as in campanula, *ammannia*, ram-pions, and throat-wort.

With respect to situation, they are either dispersed promiscuously through the pulp, (*Semina nidulantia*) as in water-lily; affixed

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affixed to a future, or joining of the valves of the feed-vessel, as in the cross-shaped and pea-bloom flowers; or placed upon a *placenta* or receptacle within the feed-vessel, as in tobacco, and thorn-apple.

Seeds are said to be naked (*semina nuda*) which are not contained in a vessel: such are those of the lipped and compound flowers, the umbelliferous and rough-leaved plants. Covered seeds, (*semina testata*) are contained in some vessel, whether of the capsule, pod, berry, apple, or cherry kind.

A simple seed is such as bears neither crown, wing, nor downy *pappus*. The varieties in seeds, arising from these circumstances, are particularly enumerated under their respective heads.

In assimilating the animal and vegetable kingdoms, Linnaeus denominates seeds, the eggs of plants. The fecundity of plants is frequently marvellous. From a single plant, or stalk of Indian Turkey wheat, are produced, in one summer, 2000 seeds; of elecampane, 3000; of sun-flower, 4000; of poppy, 32,000; of a spike of cat's-tail, 10,000 and upwards: a single fruit, or seed-vessel of tobacco, contains 1000 seeds; that of white poppy, 8000. Mr. Ray relates, from experiments made by himself, that 1012 tobacco seeds are equal in weight to one grain; and that the weight of the whole quantum of seeds in a single tobacco plant, is such as must, according to the above proportion, determine their number to be 360,000. The same author estimates the annual produce of a single stalk of spleenwort, to be upwards of one million of seeds.

The dissemination of plants respects the different methods, or vehicles, by which Nature has contrived to disperse their seeds for the purpose of increase. These by naturalists are generally reckoned four.

I. Rivers, and running waters.

II. The wind.

III. Animals.

IV. An elastic spring peculiar to the seeds themselves.

I. The seeds which are carried along by rivers and torrents,

rents, are frequently conveyed many hundreds of leagues from their native soil, and cast upon a very different climate, to which, however, by degrees, they render themselves familiar.

II. Those which are carried by the wind, are either winged, as in fir-tree, trumpet-flower, tulip-tree, birch, arbor vitæ, meadow rue, red jessamine, and some umbelliferous plants; furnished with a *pappus*, or downy crown, as in valerian, poplar, reed, succulent swallow-wort, cotton-tree, and many of the compound flowers; placed within a winged calyx, or seed-vessel, as in scabious, sea pink, dock, *dioscorea*, ash, maple, and elm-trees, log-wood and woad; or, lastly, contained within a swelled calyx, or seed-vessel, as in winter-cherry, cucubalus, melilot, bladder-nut, fumatory, bladder-fenna, heart-feed, and chich-pease.

III. Many birds swallow the seeds of vanelloe, juniper, mistletoe, oats, millet, and other grasses, and void them entire. Squirrels, rats, parrots, and other animals, suffer many of the seeds which they devour, to escape, and thus in effect disseminate them. Moles, ants, earth-worms, and other insects, by ploughing up the earth, admit a free passage to those seeds which have been scattered upon its surface.

Again, some seeds attach themselves to animals, by means of hooks, crotchets, or hairs, which are either affixed to the seeds themselves, as in hound's-tongue, mouse-ear, vervain, carrot, bastard parsley, fanicle, water hemp-agrimony, *arctopus*, and *verbefina*; to their calyx, as in burdock, agrimony, *rhexia*, small wild bugloss, dock, nettle, pellitory, and lead-wort: or to their fruit, or seed-vessel, as in liquorice, enchanter's night-shade, cross-wort, cleavers, French honey-suckle, and arrow headed grass.

IV. The seeds, which disperse themselves by an elastic force, have that force resident either in their calyx, as in oats, and the greater number of ferns; in their *pappus*, as in *centaurea crupina*; or in their capsule, as in geranium, herb-bennet, African spiræa, fraxinella, horse-tail, balsam, Malabar nut, cucumber, elaterium, and male balsam-apple.

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SEMIFLOSCULOSI, the name of the thirteenth class in Tournefort's Method, consisting of compound flowers with plain or tongue shaped florets. The term is exemplified in dandelion, nipplewort, and succory.

SEMIFLOSCULOSUS *flos*. Vide *LIGULATUS flos*.

SENTICOSÆ, (*sentis*, a briar, or bramble) the name of the thirty-fifth order in Linnæus's Fragments of a Natural Method, consisting of rose, bramble, and other plants which resemble them in port, and external structure.

List of the Genera contained in this Order.

Linnæan Genera.		English Names.
<i>Agrimonia</i> ,	—	Agrimony.
<i>Alchemilla</i> ,	—	Ladies mantle.
<i>Aphanes</i> ,	—	Percepier.
<i>Camarum</i> ,	—	Marsh cinquefoil.
<i>Dryas</i> .		
<i>Fragaria</i> ,	—	Strawberry.
<i>Geum</i> ,	—	Avens, or herb-bennet.
<i>Potentilla</i> ,	—	Cinquefoil.
<i>Rosa</i> ,	—	Rose.
<i>Rubus</i> ,	—	Raspberry, bramble.
<i>Sibbaldia</i> .		
<i>Tormentilla</i> ,	—	Tormentil.

These plants are so nearly allied in form, habit, and structure to those of the natural order, *pomaceæ*, that they ought never to have been separated from it. As we wish not, therefore, uselessly to enlarge the work by unnecessary repetitions, the reader is referred for a general description of the plants of the order *senticosæ*, with very few exceptions, to the article alluded to.

The leaves of these plants have a styptic taste. The fruits are acid and cooling. The roots of herb-bennet smell like cloves, whence the name of *caryophyllata*, by which that genus of plants was known in the time of Pliny.

With respect to their virtues, the leaves are vulnerary and
astringent.,

astringent, the roots diuretic. The subacid fruits, as strawberry, and raspberry, are used with success in putrid and bilious fevers, as likewise in contagious and epidemical dysenteries, which prevail in summer and autumn, and are occasioned by a sudden transition from a hot to a cold air, or by the acrid nature of the humours which flow into the intestines.

The inhabitants of the eastern countries sprinkle the water which is distilled from white roses, on the hands, face, head, and cloaths of the guests whom they mean to honour, and afterwards perfume them with frankincense and wood of aloes.

SEPIARIÆ (*sepēs*, a hedge) the name of the forty-fourth order in Linnæus's Fragments of a Natural Method, consisting of the following beautiful collection of woody plants, some of which, from their size, elegance, and other circumstances, seem very proper furniture for hedges.

Linnæan Genera.		English Names.
<i>Chionanthus</i> ,	—	Snow-drop tree, or fringe-tree.
<i>Fraxinus</i> ,	—	Ash-tree.
<i>Jasminum</i> ,	—	Jessamine, or Jasmine.
<i>Ligustrum</i> ,	—	Privet.
<i>Nyctanthus</i> ,	—	Arabian jessamine.
<i>Olea</i> ,	—	Olive.
<i>Phillyrea</i> ,	—	Mock-privet.
<i>Syringa</i> ,	—	Lilac.

This order furnishes woody plants both of the shrub and tree kind, most of which do not drop their leaves till nearly the time in which the new leaves begin to appear.

The flowers of jessamine, which is a native of the Indies, have a very agreeable smell; they are cordial, cephalic, anodyne, and frequently enter as an ingredient into the composition of perfumes and odoriferous oils.

The leaves of privet have a bitter acrid taste; the flowers have a strong disagreeable smell: the former are astringent; the latter deterfive.

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The Banian Indians, who are much addicted to sweet-smells and fragrant exhalations, generally wear a necklace of the flowers of Arabian Jessamine in the night-time; as it is then that they most sensibly emit their odoriferous vapours.

The flowers of a species of Arabian jessamine open in the evening, and drop off in the morning; whence the name of *arbor tristis*, or the sorrowful tree, by which Linnæus has distinguished it.

The roots of many of the plants of this order, particularly of Arabian jessamine, preserve from the dreadful consequences of the venomous bites of serpents, scorpions, and mad dogs.

The bark of olive tree has a bitter taste; the fruits, fresh as gathered, are acrid, stomachic, and heating; the oil obtained from the fruit is emollient and laxative; the leaves are astringent.

From a species of ash, the *fraxinus rotundiore folio* of Caspar Bauhin, the *fraxinus ornus* of Linnæus, which grows plentifully in Calabria and other parts of Italy, flows naturally, and by incision, a sweet juice, which, when condensed, is known by the name of Calabrian manna, and is esteemed an excellent cathartic for children, and such as are of weak constitutions.

SEXUS plantarum. The doctrine of the sexes of plants.

As it is of the utmost importance for students in botany to have precise and clear ideas upon this subject, I purpose to handle it at some length; and, that the question may be fairly and impartially stated, shall, in the first place, trace the history of the doctrine of the sexes, from its earliest appearance in botanical writings to its more improved state under the celebrated Linnæus, whose system claims it as its sole principle; secondly, enumerate and illustrate the several arguments in support of the sexes of plants; and, thirdly, examine the force and weight of the objections which are adduced to disprove the theory.

I. Theophrastus, the Father of Botany, frequently mentions the sexes of plants. He observes, that trees may be distinguished into several classes, on account of their great

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variety, but that their most common distinction is into MALE and FEMALE, the one of which is fertile, the other, in some sorts, barren. This distinction of the sexes, however, is not so much founded upon an analogy betwixt vegetables and animals, as upon the greater or less perfection of the fruit in the plants in question. In a species of palm-tree, mentioned by this author and Aristotle, the analogy in question is more strictly preserved. "If the dust of a branch of the male palm, says Aristotle, is shaken over the female, the fruit of the latter will quickly ripen; nay," continues the same author, "if this male dust shall be carried along by the wind, and dispersed upon the female, the same effect will follow, as if a branch of the male had been suspended over it." To the same purpose, Theophrastus observes, that unless the dust or down of the male palm is sprinkled over the fruit of the female; it will never ripen, but fall off. That these naturalists, however, were not clear in opinion that the fruit so sprinkled with the male dust was impregnated by it in the same manner as the ovary is fecundated in animals, appears from another passage in the last quoted author, in which he asserts, that though the fact just mentioned cannot be denied, yet no reason whatever can be assigned for the effect of the sprinkling.

Dioscorides, the next Greek botanist of note after Theophrastus, denominates many plants male and female, but without regard to analogy, or to their fertility, or barrenness. Thus his male mercury carries the seed, and the female is barren. These ideas of the sexes of plants have been transferred to our own times; and, it is not uncommon to hear peasants confounding the sexes of hemp, spinach, and hop, by calling the male plant female, and the female plant, or that which bears the seeds, male.

Aristotle, as well as Dioscorides, errs widely in his manner of distinguishing the male from the female plant; the former of which, in his opinion, is larger and stronger; the female weaker, but more fruitful.

"Naturalists," says Pliny, "admit the distinction of sex, not only in trees, but in herbs, and all plants." "Yet,"

continues,

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continues the same author, "this is no where more observable than in palms, the females of which never propagate but when they are fecundated by the dust of the male."

Upon the whole, I cannot help agreeing with Dr. Alston, that the palm-tree is the only instance among the ancients, where sexes are attributed to particular plants, on account of fertility, or barrenness. Cæsalpinus was the first who corrected the mistakes of the ancients with respect to the sex of plants, and established orthodox opinions on that subject. He observed, that in some trees, as yew, and in some herbaceous vegetables, as mercury, hemp, and nettle, the fruit was produced on one root, and flowers only on the other. The last being barren, was denominated the male plant; the other being fertile, the female. The female plants, continues the same intelligent author, succeed better, that is, become more fruitful, if sowed in the neighbourhood of the male: certain exhalations from the latter dispersing themselves over their surface, and, by an operation not to be explained, disposing them to produce riper and more perfect seeds.

Cæsalpinus's idea of sex in plants was restricted to a very inconsiderable number; those, to wit, in which the supposed organs are placed apart from each other, on separate roots produced from the same seed. In plants of this description, their analogy to animals would, in a manner, suggest itself. From the same seed are produced two different plants, the one barren, the other fertile. The analogy to the sexes of animals, immediately presents itself to the mind, and we denominate that which is barren, or bears no seeds, male; that which is fertile, or bears seeds, female. The same analogy carries us further, and induces a conjecture, that these male and female plants are connected together in such a manner, that the fecundation of the seeds of the female is produced, as in animals, by the male. This conjecture, furnished by analogy, leads to observations and experiments for its support: and thus the doctrine of the sexes, small and inconsiderable in its beginnings, becomes enlarged, and, from being con-

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finer to a very small number of plants, extends itself over the whole vegetable kingdom.

It was Dr. Nehemiah Grew who, in 1682, in conjunction with the learned Sir Thomas Millington, first suggested the universality of sexes in plants, and the primary use of the *antheræ*, *apices*, or tops of the *stamina*, in impregnating the seed. These tops, he observes, are chiefly useful to the plant itself, because all plants, even such as want the foliature or petals, are provided with them; he then plainly asserts, as his opinion, that when the tops, which he calls the attire, break or open, their inclosed *pollen* or dust falls down on the seed-bud, the vegetable *uterus*, and endues it with a prolific virtue; not, as he explains himself, by entering into it bodily, as the *semen masculinum* in animals, but by communicating to it some subtle and vivific effluvia.

This opinion of Grew was adopted by several succeeding botanists, particularly Ray, Camerarius, Geoffroy, Samuel Morland, Blair, Jussieu, Bradley, Van Royen, Malpighi, Vaillant, Ludwig, Wolfius, Logan, Monro, and the justly celebrated Linnæus.

Ray, at first, mentions Grew's doctrine only as probable, but afterwards declares his full assent to it, and collects the arguments that are used to support it.

Rudolphus Jacobus Camerarius, about the end of the 17th century, endeavoured to demonstrate the analogy betwixt the generation of plants and animals. Among other arguments for the sex of plants, he makes use of the following: "that copulation," says he, "is necessary in the generation of animals is past a doubt: that a similar junction obtains in that of plants appears from this circumstance, that if either the tops, (*antheræ*) of the male, or the styles of the female, or both, are wanting, no fecundation, and consequently no generation, can take place." This assertion he exemplifies in the mulberry-tree, mays, and mercury, in which the *stamina* of the male flowers being either plucked off before they had attained maturity, as in the two first instances, or placed at a distance from the female plant, as in the

the last, the buds that ought to have produced fruit came not to maturity. The same author speaks of the number of *stamina* in flowers; so that in his works we may recognize almost the first principles of the renowned Sexual System of Linnæus. Camerarius's objections to his own doctrine are referred to the third head of this article.

I should have observed, that, almost a century before Grew, Zaluzianski, a native of Poland, had clearly distinguished the sexes of plants, and pointed out the difference betwixt male, female, androgynous, and hermaphrodite plants. Grew's improvements on the idea of Cæsalpinus and Zaluzianski have made him generally be considered as the author of the doctrine alluded to. Certain it is that he has handled the subject with great accuracy, and endeavoured, by repeated microscopical examinations, to throw light upon this obscure, but curious enquiry.

Signior Malpighi, who was contemporary with Grew, likewise examined by the microscope the male or fecundating dust, the styles of the seed-bud, and the manner in which the *anthers* open or burst when ripe.

Morland, Geoffroy, and Vaillant, who have written successively upon this subject, all concur in asserting that the dust of the *anthers* or tops of the *stamina*, is entirely analogous to the *semen masculinum* of animals, and absolutely necessary for fecundating the seed. Morland, however, differs from Grew, in his conception of the manner in which the fecundation in question is accomplished. The latter, as we have seen, gave it for his opinion, that the fecundating dust did not enter bodily into the ovary of the plant, but operated its effect by means of some spirituous emanations, or vivifying effluvia. Morland, on the other hand, asserted that "the male dust is a congeries of feminal plants, one of which must be conveyed through the style into every *ovum* or seed before it can become prolific." This hypothesis, as the reader will easily perceive, is analogous to that of animal generation by means of *animalculæ* in *semine masculino*. Geoffroy, in a memoir presented to the Academy of Sciences at Paris in 1711 on

the structure and use of the principal parts of flowers, asserts, that the germ, or *punctum vitæ*, is never to be seen in the seed, till the *anthers* have shed their dust: and that if the *stamina* be cut out before the *anthers* open, the seed will either not ripen, or be barren if it ripens. This last is Camerarius's great argument repeated; a further illustration of it will be given below.

In 1717 M. Vaillant made some very ingenious discoveries with respect to the nature of the fecundating dust, and the manner of its explosion. He seems, says an ingenious French author, to have been the first eye-witness of this secret of Nature, this admirable sport that passes in the flowers of plants between the organs of different sexes. Vaillant is entirely of Grew's opinion, that it is the volatile spirit of the male dust, not its gross or bodily substance that enters the seeds of plants: the style, which leads to the case containing the seeds, being frequently found perfectly solid and impenetrable by that substance.

Lastly, the illustrious Sir Charles Linné has completed the doctrine of the sex of plants, by collecting all the arguments in support of it that can possibly be advanced, and by founding upon it a system, in which all vegetables are arranged under particular classes, distinguished by the number and other circumstances of their *stamina*, or male organs.

II. We come now to take a particular view of the arguments in support of the sex of plants, some of which have been just hinted at in the foregoing part of this article. These arguments arise either from a general view of the structure, proportion, and situation of the supposed organs of generation, or from experiments on those organs. The first set of arguments has been already fully handled under the article AN-THERA. Before I proceed to the other, I would beg leave to remind the reader, that the point in dispute is, whether the *pollen*, or dust of the tops of the *stamina*, is absolutely necessary for fertilizing the seeds; or, whether, on the contrary, good and perfect seeds may not be produced, when the pretended fecundating dust is denied access to the case or vessel

vessel that contains them. The sexualists maintain the former proposition; the anti-sexualists the latter.

Arguments for the Sex of Plants derived from Experiments on the pretended Organs.

1. The leading argument for the sexes is, that derived from the castration or mutilation of the flowers. This is effected by cutting off the tops of the *stamina* before they have attained maturity, and dispersed the dust contained within their substance. "If," says Wahlbom, "the *anthers* of any plant which bears only one flower are cut off, and care taken to prevent the access of any other plant of the same species, the fruit proves abortive." This observation Linnæus particularly applies to the tulip, which, in the circumstances just mentioned, he affirms to be always productive of imperfect seeds. In like manner, we are taught to believe, that, by removing all the flowers of a melon plant that are furnished with *stamina*, we render the fruit abortive; and that such abortion is occasioned, not by the loss of juice which the plant has sustained from castration, but by the inability of the fruit to mature its seeds, without the assistance of the dust of the *stamina*. Were castration in flowers to be always attended with the effect just mentioned, I should not hesitate to pronounce, notwithstanding some plausible arguments, that even then might be urged against it, that the doctrine of the sex of plants was established beyond a doubt. The fact, however, is, that the experiment in question has been performed upon very few plants, and, in many instances, has not been attended with the desired success.

2. Another argument for the sexes arises from the sterility of plants in which, from excess of nourishment, the *stamina* are totally excluded, and degenerate into petals. Of this kind are all full flowers, the seeds of which never ripen. Luxuriance of nourishment has a similar effect on animals in destroying their generative faculties.

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3. If, when the tops of the *stamina* are cut off, the dust of a flower of a different species is shaken over the *stigma*, or pretended female organ, the seeds ripen, and produce plants, which partake of the nature of both the fecundating and fecundated species. Such plants too resemble mules in the animal kingdom, and neither generate nor perfect seeds.

4. Another argument for the sexes arises from experiments on plants in which the *stamina* are produced on one root, and the seeds on another. Castration, we have seen, succeeds only in plants which have the *stamina* either inclosed within the same covers, or placed upon a different part of the same plant with the seeds. In plants that have the supposed male and female organs placed upon distinct roots obtained from the same seed, the sexualists pretend, that the impregnation in question is accomplished, as in other plants, by the dust of the *anthers*, which is conveyed by the wind, or some other means, and shed over the *stigma* of the female plant: such plants being, for this purpose, as they affirm, generally found in the neighbourhood of one another. Linnaeus asserts, that a female plant of the rose-root, which grew in the Botanical Garden at Upsal, was barren from 1702 to 1750, when a male plant being brought, it produced ripe and perfect seeds. The same author relates, that the genus *clutia* which had been barren in most of the gardens in Holland, being found to ripen seeds at Leyden, he concluded that a male plant of that species was in the neighbourhood, which, upon strict search being made for that purpose, was found in reality to be the case.

5. The culture of palm-trees, as related both by ancient and modern authors, has furnished a striking argument for the sex of plants.

We have already mentioned the testimonies of Theophrastus, Pliny, and Aristotle, on this subject, who seem, however, to speak from the relations of others, more than from their own proper knowledge and experience. Kämpfer, Prosper Alpinus, Father Labat, Dr. Hasselquist, and other modern writers, have joined their testimonies to those delivered

delivered by the ancients, and agree in asserting, that though the date-bearing palm may produce good dates, without the assistance of the flowering or male palm, yet, that the date-stones, which are the seed of the plant in question, will not grow.

The two last authors having been eye-witnesses of the culture they describe, deserve particular attention. “ I had the pleasure, (says Dr. Hasselquist, in his journey to Damietta) of seeing one of the most remarkable sights in nature. A date-bearing, or female palm, had put forth its blossoms from the *spatha*. I went to see it, and found a gardener, the proprietor, climbing up the tree, which equalled our largest firs in height; *he had a bunch of male flowers, with which he powdered the female, and thus rendered them fertile.*” Again, in a letter to Dr. Linnæus, dated from Alexandria—“ The first thing I did after my arrival in Egypt, was to see the date-tree, the ornament, and a great part of the riches of this country. It had already blossomed, but I had, nevertheless, the pleasure of seeing in what manner the Arabs assist its fecundation, which is as follows. When the *spadix*, or receptacle of the palm bears female flowers, they search on a male palm for a *spadix* which has not yet burst, or been protruded from its sheath (*spatha*); this they open, take out the *spadix* and cut it lengthwise in several pieces, taking care not to hurt the flowers. A piece of this *spadix* with male flowers is put lengthways between the small branches of the *spadix* with female flowers, over which is laid a palm-leaf. In this situation, continues the doctor, I yet saw the greatest part of the *spadices* or heads of flowers which bore their young fruit; but the male flowers, which were intermingled with the female, were withered. The Arab, who informed me of these particulars, gave me likewise the following anecdotes. First, unless they wed, and fecundate the date-tree in this manner, it bears no fruit. Secondly, they always take the precaution to preserve some unopened *spathæ* with male flowers, from one year to another, to be applied for this purpose, in case the male flowers should miscarry, or suffer damage. Thirdly,

Thirdly, *if they permit the spadix of the male flowers to burst or come out, it becomes useless for fecundation: they must have its VIRGIN-HONOURS*, (these were the words of the Arab) which are lost in the same moment the blossoms burst out of their case. The person, therefore, who cultivates date-trees, *must be careful to hit the proper time of assisting their fecundation, which is almost the only article in their cultivation.*" *Vide* Dr. Hasselquist's Travels in the Levant, p. 112 and 416.

Father Labat's testimony respecting the fecundation of the female palm by the male, deserves credit the rather, as this author professes himself dissatisfied with the doctrine in question. His words are these. "It is pretended that the date-tree is male and female; that the male flowers, but bears no fruit, that task being left to the female, which likewise proves barren, unless it be situated in the neighbourhood, or at least within sight, of the male. I am sorry, continues that Reverend Father, that I cannot subscribe to this opinion of the naturalists, being prevented by a certain fact, consisting with my own knowledge, which is directly contradictory to that opinion. Near our monastery in Martinique is a date-tree which bears fruit, though single; whether it is male or female I know not, but of this I am certain, that for more than two leagues round, there was not then, nor, as I am informed, ever had been any tree of the same kind; whence we may, I think, reasonably conclude, that the presence of the male is not so necessary for the purpose of fecundation as naturalists pretend. It may indeed be said, that this tree, in default of a male of its own species, availed itself, like certain animals on the coast of Africa, of the prolific virtue of any male in its neighbourhood, whether allied to it or not. In fact, there are some cocoa-trees in the neighbourhood of our date-tree, which, in all probability, might have performed the function of the male palm, and rendered our female fruitful." *Vide* Nouveau Voyage aux Isles de l'Amerique, tom. 3, chap. 2.

Of this concession of the Reverend Father, I do not mean to avail myself; because, I shall soon convince the reader,
from

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from that author's own words, that no fecundation, of whatever kind, had taken place in the instance in question. For, continues Labat, "*the stones of the island date-trees will not rise*; so that those who would raise palm-trees, are obliged to plant the Barbary date-stones, which have the germ or *punctum vitæ* necessary for the production of a new plant. Thus we see, hens lay eggs without the assistance of the cock; but these eggs cannot be hatched, or produce chickens, because they have not the *germ*, or *punctum vitæ*, which is communicated only by the male." This illustration is exceedingly apt, and is indeed the very example I should myself have recurred to. It is evident then, that though in the instance just given, the date, that is, the seed-vessel, attained maturity; yet the stones, that is, the seeds, however seemingly ripe, were barren, and upon trial, found totally incapable of producing their like. M. Labat's mistake consists in a misapprehension of the term fruit; which is never to be understood of the vessel, or case containing the seeds, but of the seeds themselves. In the former sense, the fruit may often attain maturity, and yet the seeds prove barren. This is what happened to the date-tree of Father Labat; it is what happens in many figs, the fruit of which, in the vulgar acceptation of that word, is merely the common calyx of a number of female flowers that line its internal surface.

With respect to that part of Dr. Hasselquist's relation, which affirms, that the date-tree, unless fecundated by the male, bears no fruit, we are to understand the term fruit in its genuine acceptation, of ripe and perfect seeds. For that date-trees which prove barren never bear dates, is contradicted by the concurring testimony of all the writers on this subject. That the dates are greatly meliorated in point of richness and taste, by the assistance of the male, and that, when solitary and barren, they are frequently apt to fall off, before they have attained perfect maturity, are facts which cannot be disputed; yet their barrenness does not hinder them from becoming soft, yellow, luscious; in a word, of shewing every indication of perfect ripeness, excepting that they retain a slight

slight degree of sharpness, which possibly might be removed by fecundation.

6. Another argument for the sexes, is derived from the curious husbandry of fig-trees, as practised to this day in the Levant, and known by the name of caprification.

An ample description of this mode of culture is given under the article CAPRIFICATIO, whither we refer the reader.

7. If the stigma, or top of the pointal, is cut off; if its moisture is absorbed by continued smoke, or long tracts of rain; if sudden frosts hinder the anthers from opening, or violent rains dilute and carry off their dust: in all, or any of these cases, no fecundation, say the sexualists, will ensue, and the fruit is diminished, both in point of quantity and quality. Abortions of this kind are frequently observed in the cherry, almond, peach, plum, apricot, apple, and pear trees, vices, barley, oats, rye, and wheat, when there are long uninterrupted tracts of rain at the time of their flowering. If, on the contrary, the air is dry and serene during that season, the crop is both excellent and abundant.

“Most flowers, says Wahlbom, expand themselves during the influence of a burning sun, but close at night and in moist weather, lest the water should dilute, and wash off the powder of the stamina, and thus prevent it from impregnating the seeds; but that operation once effected, the flowers no longer contract as formerly at nights, nor during the continuance of heavy rains.” He adds, “that rye, wheat, many grasses and plantains, thrust out their *anthers* when in flower, on pretty long stamina, and thus expose the inclosed powder to be washed away by the rains. The consequence is, that the florets so castrated prove abortive; and this abortion taking place in any of the esculent grasses, creates a scarcity.

Lastly, another argument for the sexes, is derived from the disposition of some aquatic plants to flower only above the water. “The contrivance of Nature,” says Gcsner, “is truly admirable in the flowers of aquatic plants which are furnished with the fecundating dust. At the time of flowering,

flowering, the flowers being specifically lighter than the water, are carried above its surface, that the fecundation may be performed in the air, and the generating substance may not be diluted by the water."

Water-lily, marsh-aloe, *wallisneria*, pond-weed, and frog's bit, furnish familiar examples of the circumstance alluded to. There are, however, several plants, particularly triple-headed pond-weed, *ruppia*, *isoetes*, duck meat, wrack or sea-weed, and ceratophyllum, which flower under the water, either because the dust of the *stamina*, and the moisture of the *stigma*, are of such a nature as not to be affected or altered by it; or, that the former acts only by a subtle vapour, analogous to the atmosphere of electrical bodies.

III. The arguments against the sexes of plants, which come now to be considered, are collected by the ingenious Professor Alston, in his Tyrocinium Botanicum, and in a Dissertation on the Sexes of Plants, to be found in the first volume of the Edinburgh Physical and Literary Essays. The Doctor's method is to state, from different authors, the several facts that are adduced in support of the doctrine; and then to refute it by another set of facts directly contradictory in their nature to the former. In prosecuting this method, he is frequently betrayed into an acrimony of expression little suited to the gravity and dignity of a philosophical discussion. He terms the refined and ingenious Sexual System of Linnæus a *hideous superstructure*; and his analogies between plants and animals *fulsome and obscene*; and though he is at every turn complimenting him with "the justly celebrated Linnæus, the prince of modern botanists," and such like epithets; yet he scruples not to assert, that he has done much more prejudice than good to science, and that, in fine, his method in botany is worse than no method at all. With these abatements, the Dissertation on the Sexes is a sensible and spirited performance; and, whilst it discovers the author superior to vulgar prejudices and errors, displays a laudable aversion to new hypotheses in philosophy, that do not to him appear properly supported by reason and fact.

The objections to Linnæus's arguments, from the situa-
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tion and proportion of the organs, are puerile and trifling; the facts, mentioned by that author, whether conclusive or not, are certainly true: and, if true, to call them in question, is to add considerably to their importance in the scale of argument. The same may, in general, be said of the argument drawn from the coincidence in point of time, of the *anthers* and *stigma*: though, in some particular instances, as spinach, mercury, hemp, maize, and juniper, the *stamina* commonly shed their dust before the *stigmata* or supposed female organs have attained maturity.

“ In plants which have the *stamina* and seeds on distinct roots, the flowers, says Linnæus, generally come out before the leaves, lest the latter should cover the female organ, and prevent the access of the fertilizing dust.” Willow and poplar are adduced as examples. In these instances, the fact is certainly as represented by the learned author; and the reason assigned for it, however imaginary, is ingenious. Dr. Alston finds great fault with Linnæus for qualifying his allegations with a *generally*. General affirmations are, in my opinion, highly proper in disquisitions of this kind, where the subjects are so numerous, that a separate examination of each is impracticable.

The argument for the sexes from castration is attempted to be refuted in two different ways.—1. Supposing its effect to be uniformly as represented by Linnæus, and the sexualists, it does not follow, says Alston, that the use of the powder of the *stamina* in fecundating the seeds is clearly demonstrated: as wounds in a necessary part of the plant, together with the loss of juice issuing from them, may well account for the consequent barrenness and abortion of the seeds. Malpighi affirms, that he produced a somewhat similar effect on the seeds of tulip, by plucking off the petals before their expansion. But, 2; says Alston, there is reason to deny the fact. In Geoffroy’s Experiment on Maize, some of the ears ripened a few seeds, although the *stamina* were entirely cut out before the opening of the *anthers*. An experiment of the same kind performed by Dr. Alston himself, deserves attention. “ Observing,” says he, “ one year, two
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“ strong tulips growing together, in an inclosure surrounded
 “ with a tall and thick quickset hawthorn-hedge, I cut
 “ down two or three more tulips, which stood at some dis-
 “ tance from them, so as to leave none without that inclo-
 “ sure, save the two I mentioned; out of these, gently
 “ opening the petals, I plucked all the *stamina* with their
 “ *apices* still entire. The consequence of this too rude cas-
 “ tration was a considerable extravasation of the juices in
 “ the bottom of the flower, and a sudden decay of the
 “ *ovarium* or fruit, which never increased, but turned yellow,
 “ shrunk and withered. In order to discover whether this
 “ abortion was owing to the wounds, or to the want of the
 “ dust of the *apices*, I suffered these two tulips to remain in
 “ the place where they were; and next season, having ob-
 “ served the same precaution that no other tulip should flower
 “ within the inclosure, I opened the petals, and took out
 “ carefully, not the *stamina*, but only all the *apices*, which
 “ prevented any sensible bleeding of the parts. This more
 “ gentle castration, they bore perfectly well; the *ovarium*
 “ suffered nothing in either of them, but increased and came
 “ to maturity, quite full of seeds.”

These experiments, so far from refuting the doctrine of
 the sexes, seem, in my opinion, to confirm it. For though
 both Geoffroy and Allston affirm that the fruit ripened and
 was filled with seeds, yet it does not appear that these seeds
 were ripe or capable of vegetation. The same thing pos-
 sibly happened to these plants, as to the date-tree of Father
 Labat, which bore ripe dates, the stones of which, however,
 never rose. Be this as it may, the experiment just recited
 is imperfect and inconclusive because totally silent on that
 head.

The next set of arguments against the sexes is derived
 from experiments on plants which have the pretended male
 and female organs of generation placed apart on distinct
 roots. Camerarius relates that, in the course of his expe-
 riments, he observed the female plants of spinach, mercury,
 and hemp, which had been placed without the reach of the
 male, produce ripe and perfect seeds; a circumstance which,

as Valentini observes, made Camerarius express himself with doubt of the doctrine of the sexes, of which he had been a strenuous advocate. The following experiments of Dr. Allston upon the same plants, if faithfully narrated, bid fairer to be decisive on this subject, than half the refined and ingenious arguments of his opponent.

“ In spring, 1737,” says the doctor, “ I transplanted three sets of the common spinach, long before it could be known whether they were flowering or seed-bearing plants, from a little bed on which they were raised, into a place of the garden, full eighty yards distant, and almost directly south; there being two hawthorn and three holly hedges, all pretty thick and tall, between them and their seed-bed, and no other spinach in the garden; all the three proved fertile plants, and ripened plenty of seeds. I sowed them, they grew, and prospered as well as any spinach-seed possibly could do.

“ The same year, a few plants of the common hemp, which I had raised for a specimen from the seed, being accidentally destroyed when very young; and finding afterwards, about the end of June, a pretty strong, but late plant of hemp, growing by itself, I caused great care to be taken of it, there not being that year any hemp raised within a mile of it that I could find. This plant grew luxuriantly; and, though bad weather in the autumn made me pluck it up a little too soon, yet I got about thirty good seeds from it, which, the succeeding spring, produced as thriving male and female plants, as if the mother hemp had stood surrounded with males.”

It is, I confess, a matter of no small difficulty for the Sexualists to elude the force of the conclusion manifestly deducible from the result of these experiments, and to explain in a manner that shall be satisfactory to their opponents; how, on their favourite principle, in the total absence of male plants, seeds should be produced *in great abundance*, which not only *seemingly* ripened, as in the case of the date-tree of Father Labat, but attained such perfect maturity, as to be capable of vegetation, and actually to vegetate. By

his touchstone, indeed, we are to try the intrinsic value of every experiment which has the determination of the present problem for its object : and it is only in consequence of a series of experiments of the same kind, undertaken without prejudice, accurately conducted, well authenticated, and tried by the test just mentioned, that the doctrine of the sex of plants must ultimately stand or fall. It is not enough, however, (and the caution cannot be too often repeated) that plants seem only to ripen seeds without the assistance of the *pulvis antherarum* ; those seeds, to be perfect, and to render the argument conclusive, must contain the embryo of a new plant, which, upon being lodged in the soil, will unfold itself, and produce an individual in every respect similar to its parent vegetable. For want of this necessary test, nothing can be concluded from M. Tournefort's assertion of a female hop which produced ripe fruit every year, in the king's garden at Paris, although no male of that species was to be found within many miles of it. For, without enquiring with Wahlbom, whether the cones of the hop be a calyx or a seed-vessel, which, I think, has nothing to do with the present question, I affirm that there is no evidence whatever, from Tournefort's Narration, that the seeds which he pretends were produced by this plant, made any efforts towards vegetation, or, indeed, that any trials were made for that purpose. The author is quite silent on this head ; and hence the argument that has been erected upon his assertion is totally inconclusive.

The argument for the sexes from the culture of palm-trees has never received a satisfactory answer. Father Labat's testimony, which Alston opposes to the clear and pointed evidences of other authors, makes, as we have seen, directly against him.

As to Herodotus's assertion that the date-trees, in the neighbourhood of Babylon, were fecundated by means of gnats, which, lodging in the fruit of the male palm, issued from it, and entered into that of the female, it is directly contradicted by the authority of every author, both ancient and modern, who has treated of the culture of palm-trees : and, if true, would but reduce that culture to the head of caprification,

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which is, in my opinion, one of the strongest arguments for the sexes that can possibly be advanced.

The differences among the authors who treat of the fecundation of date-trees, with respect to the manner in which the fertilizing dust is conveyed to the female, and the consequences of their sterility, are much insisted upon by Alston. But these differences prove nothing; since the authors in question all agree in this, that the dates, to be fecundated, must have the assistance of the *pulvis antherarum* of the flowering palm.

The last argument I shall mention is drawn from a comparative view of the nature of seeds and buds. The smallest sensible particle of every plant, says Alston, after Malpighi, is organized in the same manner as the whole. Hence, if planted in the ground, each piece would probably, in progress of vegetation, become a plant in every respect similar to the parent vegetable. Hence, likewise, many plants are better and more easily propagated by cuttings, layers, off-sets, germs or buds, than by seeds. Hence, garlick, onions, leeks, tulips, and lilies, frequently carry germs or cloves on the tops of the stalks, as well as at their roots under ground. A bud is the compendium or rudiment of a plant which only wants the power of extending or unfolding its parts. But seeds contain, likewise, the *primordia plantarum*; buds, therefore, contain the most essential parts of seeds, and differ from them only in the same manner as the living fœtus differs from the egg. In this view, buds are nothing else than seeds in a more perfect state, or in a higher stage of vegetation. Now since buds are copiously produced by numberless plants, and often break out of the smoother part of the bark, especially of pruned trees; and, since the smallest part of a plant may be made to grow, and emit gems, whether it be naturally fertile or barren, male, female or hermaphrodite;—why, continues the Doctor, may not seeds, which are only a more imperfect kind of buds, be produced, without the assistance of the *pulvis antherarum*, or the intervention of any mode of generation whatever?

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This argument is plausible, but cannot overturn the direct evidence in favour of the sexes that has been already stated.

I am far, however, from wishing to obtrude my opinion upon the reader, or improperly influence his belief. The principal facts on both sides of this curious and important question lie before him; it belongs to him to estimate their credibility and weight, and to determine accordingly. Opinions, if founded in truth, as they cannot be overturned by sophisms, so neither can they suffer from the minutest examination. On the contrary, if established in error, an exact and impartial scrutiny is the most probable means of removing the deception, by detecting their fallhood.

SILICUA, a species of pod, in which the seeds are alternately fixed to either suture or joining of the valves; in this it differs from the *legumen*, which has its seeds attached to one suture only. This kind of seed-vessel, which is found in all the cross-shaped flowers of Tournefort, or *tetradynamia* of Linnæus, is distinguished, by the last author, after Ray, from its form, into *siliqua* properly so called, and *silicula*, or little *siliqua*. The former is much longer than broad, as in mustard, radish, rocket, wall-flower, lady's smock, and water-cress. The latter is almost round, the longitudinal and transverse diameters being nearly equal; as in honesty, mad-wort, shepherd's-purse, scurvy-grass, candy-tuft, and some other cross-shaped flowers. This difference in the form of the fruit is the foundation of the two orders in Linnæus's class *tetradynamia*, which corresponds to the *cruciformes* of Tournefort, and *siliquosæ* of Ray.

The seeds within both *siliqua* and *silicula* are attached, as to a placenta, to the sutures or joining of the valves, by means of a small thread or foot-stalk, which performs the office of the umbilical rope.

SILICUOSÆ (*siliqua*, a pod) the name of a class in Morison, Hermannus, Ray, and Royen's Methods, consisting of plants which have a *siliqua* for their seed-vessel. Of this kind are the cross-shaped flowers of Tournefort, and *tetradynamia* or plants having flowers with four long and two short stamens of Linnæus.

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SILICUOSÆ is, likewise, the name of the thirty-ninth order in Linnæus's Fragments of a Natural Method, consisting of plants which have the general character just mentioned.

List of Genera contained in this Natural Order.

S E C T I O N I.

Cross-shaped Flowers with long Pods, (siliquæ).

Linnæan Genera.		English Names.
<i>Arabis,</i>	—	Bastard tower-mustard.
<i>Brassica,</i>	—	Cabbage, turnip, rape.
<i>Bunias.</i>		
<i>Cardamine,</i>	—	Ladies-smock.
<i>Cheiranthus,</i>	—	Stock, wall-flower.
<i>Crambe,</i>	—	Sea cabbage.
<i>Dentaria,</i>	—	Tooth-wort.
<i>Erysimum,</i>	—	Hedge-mustard.
<i>Heliophila.</i>		
<i>Hesperis,</i>	—	Rocket, queen's July-flower, or dame's violet.
<i>Isatis,</i>	—	Woad.
<i>Raphanus,</i>	—	Radish.
<i>Ricotia.</i>		
<i>Sinapis,</i>	—	Mustard.
<i>Sisymbrium,</i>	—	Water-cress.
<i>Turritis,</i>	—	Tower-mustard.

S E C T I O N II.

Cross-shaped Flowers with short round Pods (siliculæ):

<i>Alyssum,</i>	—	Mad-wort.
<i>Anastatica,</i>	—	Rose of Jericho.
<i>Biscutella,</i>	—	Buckler-mustard.
<i>Clypeola,</i>	—	Treacle-mustard.
<i>Cochlearia,</i>	—	Scurvy-grass, or spoon-wort.
<i>Draba,</i>	—	Whitlow-grass.
<i>Iberis,</i>	—	Candy-tuft, or scitica-cress.
<i>Lepidium,</i>	—	Dittander, or pepper-wort.

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Linnæan Genera.		English Names.	
<i>Linaria</i> ,	—	—	Satin-flower, honesty, or moon-wort.
<i>Myagrum</i> ,	—	—	Gold of pleasure.
<i>Peltaria</i> .			
<i>Subularia</i> ,	—	—	Rough-leaved alysson.
<i>Thlaspi</i> ,	—	—	Mithridate - mustard, shepherd's purse.
<i>Vella</i> ,	—	—	Spanish-crefs.

Habit and Structure of the Plants of this Order.

This order chiefly furnishes biennial and perennial herbs of an irregular figure; *brassica*, sea-cabbage, Spanish-crefs, and some species of stock and *thlaspi*, form ever-green shrubs of a round and beautiful figure.

The **ROOTS** are long, branched, crooked, and fibrous. Those of turnip and radish are succulent and fleshy. In tooth-wort, they appear jointed.

The **STEMS** and young branches are cylindric.

The **LEAVES**, which differ in point of form, being sometimes simple, sometimes winged, are generally placed alternate. In a species of *thlaspi* with a red flower, and a perennial species of moon-wort, the leaves at the bottom of the stalk and branches are opposite.

From the arm-pits of the leaves of a species of treacle-mustard, issues a large, erect thorn. The plant is generally known by the name of shrubby prickly alysson.

The **FLOWERS** are hermaphrodite, and in the greater number, disposed in a spike at the extremity of the branches. They are easily rendered double by culture.

The **FLOWER-CUP** is composed of four leaves, which are oblong, hollow, blunt, bunched at the base, and fall with the flower. These leaves are sometimes erect, as in Spanish-crefs, radish, hedge-mustard, stock, cabbage, rocket, and tooth-wort; sometimes spread horizontally, as in mustard, water-crefs, woad, and lady's-smock.

The **PETALS**, which are four in number, spread at top, and are disposed like a cross; whence the name of cross-

shaped flowers, by which Tournefort has designed this natural order; a characteristical mark which, because more obvious, is, in my opinion, preferable to that derived from the inequality of the stamina.

The claws, or lower part of the petals, are erect, flat, awl-shaped, and somewhat longer than the calyx. The upper part widens outwards. In candy-tuft, the petals are unequal, the two outermost being much larger than the other two. A species of lady's-smock, the *cardamine impatiens* of Linnæus, as likewise the *lepidium ruderales* of the same author, want the petals.

The STAMINA are six in number, two of which are of the length of the calyx, and the remaining four somewhat longer, but shorter than the petals. Upon the circumstance of the inequality of the stamina, combined with their number, is founded the class *tetradynamia* of the Sexual Method, which contains all the cross-shaped flowers.

The ANTHERS are of an oblong figure, pointed, thicker at the base, and erect. In a species of Spanish-cress, the *vella pseudo-cytisus* of Linnæus, the four longer filaments are castrated, or want tops. Some species of dittander have only two stamina; a Virginian species of the same genus has three. The two lesser filaments in mad-wort are indented at the base; in which circumstance consists the essential character of the genus. In a species of lady's-smock, the *cardamine hirsuta* of Linnæus, the two lesser stamina are generally wanting. In sea-cabbage, each of the longer filaments is divided at top into two parts; the *anthers* being placed upon the outermost branch.

Betwixt the *stamina* in plants of this order, are generally lodged one, two, or four round greenish knots, which in some genera are so small as to elude the sight. These knots, called by Linnæus GLANDULÆ NECTARIFERÆ, and used by that author as an essential character in discriminating the genera, seem to be prominences of the receptacle of the flower, occasioned by the stamina being deeply lodged in its substance. This opinion seems more probable, as in treacle-mustard, rough-leaved alysson, gold-of-pleasure, and some others,

others, which have the stamina slightly attached to the surface of the receptacle, no knots or glands are observed. In bastard tower-mustard, the knots in question are placed betwixt the leaves of the calyx, to which they seem appendages or ears. In the greater number they are seated between, or close to, the stamina, particularly the two shorter ones, to the base of which they are fastened.

The SEED-BUD is single, and stands upon the receptacle of the flower. The *style*, which is either cylindric, or flat like a scale, is of the length of the four longer stamina in the plants of the second order; in those of the first, it is very short, or even wanting. It accompanies the seed-bud to its maturity. The *stigma* or summit of the style is blunt; and sometimes, as in stock and rocket, deeply divided into two parts.

The SEED-VESSEL is a long pod in plants of the first section; a short and round one, in those of the second. Either sort has two valves or external openings, and in a great many genera, the same number of internal cavities, the partition of which projects at the top beyond the valves. In a species of gold-of-pleasure, the *myagrum monospermum latifolium* of Caspar Bauhin, there are three cells, two of which, being those next the top of the pod, prove abortive; the remaining cell at the base contains a single seed. In radish, the pods are jointed; in hedge mustard, square.

The SEEDS are roundish, small, and attached alternately by a slender thread to both futures or joinings of the valves.

These plants have a watery, sharp, lixivial taste, and are charged with a fixed alkaline salt, which is drawn from them by burning, and being distilled, without any addition, produces a volatile alkali.

Most of the plants in question have a stinking smell. *Erysimum alliaria*, and a species of *thlaspi*, smell strongly of garlick.

With respect to their virtues, they are attenuating, detensive, diuretic, and antiscorbutic. These qualities, however, are most eminently possessed by the live plants; when

dried, they either entirely disappear, or are greatly diminished.

Applied externally, these plants are useful in diseases of the skin, as itch and leprosy.

SOLUM plantarum. The natural soil of plants. Each species of plant affects a particular soil in preference to every other. In the culture of plants, therefore, it is of very great importance to have a distinct knowledge of their soil and loca natalia, that the nature of the soil and earth in which they are cultivated may be made to approach, as near as possible, to that in which they spontaneously grow.

This subject then, as is evident, pertains more properly to gardening than botany. To the former, indeed, it serves as a proper and solid foundation; in the latter it is merely a curious speculation, which, however, cannot fail, if properly handled, of affording instruction as well as amusement.

The reader is referred, for ingenious conjectures on this subject, to the head ADUMBRATIONES in Linnæus's *Philosophia Botanica*.

SPADICEUS flos, (from *spadix*); an aggregate flower, in which the receptacle is inclosed within a *spatha* or sheath that is common to many florets. This term, used by the ancients only of palms, is extended by Linnæus to all flowers which, like narcissus, calla, dracontium, pothos, arum, and zosteria, are protruded from that species of common calyx called a *spatha* or sheath.

SPADIX, anciently signified the receptacle of the palms. It is now used to express every flower-stalk that is protruded out of a *spatha* or sheath.

The spadix of the palms is branched; that of all other plants, simple. This last case admits of some variety. In calla, dracontium and pothos, the florets cover it on all sides; in arum, they are disposed on the lower part only; and in zosteria, on one side.

SPATHA, a sheath; a species of calyx which bursts lengthways, and protrudes a stalk supporting one or more flowers,

flowers, which commonly have no *perianthium* or proper flower-cup.

The *spatha* opens on one side, from bottom to top, and consists either of one piece, as in narcissus, snow-drop, and the greater number of spathaceous plants; of two, as in *Andropogon*; or of a number of scales laid over one another like tiles, as in plantain-tree.

SPATHACEÆ (from *spatha*, a sheath) the name of the ninth order in Linnæus's Fragments of a Natural Method, consisting of plants whose flowers are protruded from a *spatha* or sheath.

List of the Genera contained in this Natural Order.

Linnæan Genera.		English Names.
<i>Allium</i> ,	—	— Garlick, onion, &c.
<i>Amaryllis</i> ,	—	— Lily-daffodil.
<i>Bulbocodium</i> .		
<i>Colchicum</i> ,	—	— Meadow-saffron.
<i>Crinum</i> ,	—	— Asphodel-lily.
<i>Galanthus</i> ,	—	— Snow-drop.
<i>Gethyllis</i> ,		
<i>Hæmanthus</i> ,	—	— Blood-flower.
<i>Leucoium</i> ,	—	— Greater snow-drop.
<i>Narcissus</i> ,	—	— Daffodil.
<i>Pancratium</i> ,	—	— Sea daffodil.

These plants are nearly allied in habit and structure to the liliaceous plants, from which they are chiefly distinguished by the *spatha* or sheath out of which their flowers are protruded. *Vide* CORONARIÆ.

SPICA, properly an ear of corn, a spike; a mode of flowering, in which the flowers are ranged alternately upon both sides of a simple common flower-stalk. The term is exemplified in arum, American night-shade, pepper, and several of the grasses. The flowers in a spike are seated immediately upon the stalk, without any partial foot-stalk, in which it differs from the *racemus* or cluster. A spike is
said

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said to be single-rowed (*spica secunda*) when the flowers are all turned towards one side, as in *dactylis cynosuroides*; double-rowed (*spica disticha*) when they look to both sides, or stand two ways.

SPINA, a thorn; a species of armature or offensive weapon, protruded from the wood of the plant, and, therefore, of a stronger and harder nature than prickles, which are detached portions of the bark.

Thorns are either simple, as in most plants; double, as in horned acacia; or triple, as in another species of acacia, hence termed triple-thorned.

Spines are protruded either from the stem and branches, as in buck-thorn, pear, plum, and orange-trees; from the foot-stalks of the leaves, as in false-acacia; from the leaves themselves, as in aloe, American aloe, Adam's needle, holly, manchineel, carline-thistle, artichoke, bear's-breech, juniper, milk-wort, butcher's-broom, and sea-pink; from the ribs of the leaves, as in several of the night-shades; from the calyx, as in thistle, centaury, and mad-apple; or, lastly, from the seed-vessel or fruit, as in caltrops, spinach, agrimony, and thorn-apple.

Some plants lose their spines, as the branches of pear, citron, orange, lemon, medlar, hawthorn, and gooseberry bush, by culture; the leaves of holly, by age.

M. Duhamel compares thorns, which are an expansion of the lignous body, to the horns of animals, which adhere to the bones of the skull, and are protruded from them.

STAMINA, threads or chives. The slender threads which in most flowers are placed round the seed-bud. They are defined by Linnæus to be entrails of the plant, destined for preparing the *pollen* or fine powder which the Sexualists affirm to be the main agent in the generation of plants.

The form of each stamen is generally that of a slender thread, surmounted by a small prominence or button containing a powder. Hence its division into,

Filamentum, the slender thread-shaped part resembling a foot-stalk, which supports the

Anthera,

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Anthera, or summit, a small sack or capsule with one or two cavities, attached differently to the filament.

Pollen, the fecundating dust contained within the anthers, which discharge it when ripe.

Each of these terms is particularly explained under its respective head.

STELLATÆ (*stella*, a star) the name of a class in Hermannus, Boerhaave, and Ray's Methods, consisting of plants with two naked seeds, and leaves disposed round the stem in the form of a radiant star. The term is exemplified in madder, lady's bed-straw, cross-wort, and woodroof.

STELLATÆ is, likewise, the name of the forty-seventh order in Linnæus's Fragments of a Natural Method, consisting of plants which possess the general characters just mentioned.

List of the Genera contained in this Order.

Linnæan Genera.		English Names.	
α	<i>Antbospermum</i> ,	—	Amber-tree.
	<i>Asperula</i> ,	—	Woodroof.
	<i>Crucianella</i> ,	—	Petty madder.
	<i>Diodia</i> .		
	<i>Galium</i> ,	—	Ladies bedstraw, or cheese- rennet,
	<i>Hedyotis</i> .		
	<i>Knoxia</i> .		
	<i>Lippia</i> .		
	<i>Phyllis</i> ,	—	Bastard hare's-ear.
	<i>Richardia</i> .		
	<i>Rubia</i> ,	—	Madder.
	<i>Sherardia</i> ,	—	Little field-madder.
	<i>Spermacoce</i> ,	—	Button-weed.
	<i>Valantia</i> ,	—	Cross-wort.
β	<i>Houstonia</i> .		
	<i>Oldenlandia</i> .		
	<i>Ophiorrhiza</i> .		
	<i>Spigelia</i> ,	—	Worm-grass.

γ *Coffea*,

Linnæan Genera.

English Names.

<i>Coffea</i> ,	—	—	Coffee-tree.		
<i>Cornus</i> ,	—	—	Dogwood,	or	cornelian cherry.
<i>Ixora</i> .					
<i>Pavetta</i> .					
<i>Psychotria</i> .					

This order, which, in its present form, is far from Natural, contains herbs, shrubs, and trees. The herbs, which are most numerous, are chiefly annual, and creep along the surface of the ground. The shrubs and trees are chiefly evergreens, which rise erect, and are of an agreeable conic form.

These plants are of an opening nature; their seeds, particularly those of coffee, are bitter and cordial. *Galium verum* possesses the property of curdling milk. The roots of madder are greatly esteemed by dyers for the beautiful-red colour which is procured from them. A species of hedyotis possesses the same quality. An infusion of arapabaca or *Spigelia* is specific against worms; whence the English title of worm-grass by which this genus of plants has been designed. The roots of ophiorrhiza, as the name imports, preserve from the dangerous consequences of the venomous bites of serpents.

STIGMA, (properly a mark or brand, à *στιζω*, pungo,) the summit of the style, accounted by the sexualists the female organ of generation in plants, which receives the fecundating dust of the tops of the stamina, and transmits its vapour or effluvia through the style into the heart of the seed-bud, for the purpose of impregnating the seeds.

Most plants have a single stigma. Lilac has two of these organs; bell-flower three; in French willow, herb, and grass-of-Parnassus, they are four in number; in winter-green, five. With respect to figure, the stigma is either round, as in primrose; oval, as in genipa; cross-shaped, as in penæa; shaped like a target, as in water-lily, poppy, and

and side-saddle flower ; in the form of a crown, as in winter-green ; hooked, as in violet and American viburnum ; ribbed or furrowed, as in meadow-saffron ; shaped like a head (*capitatum*) as in periwinkle, caltrops, scarlet-convolvulus, and clusia ; angular, as in muntingia ; of the nature of a leaf, as in iris ; or covered with down, as in cucubalus, rhubarb, tamarisk, the grasses, and most of the pea-bloom flowers.

The divisions of the stigma are slender like hairs, as in dock ; twisted into several convolutions, as in crocus ; turned backwards, as in campanula, pink, and the compound flowers ; or bent to the left as in viscous campion. These divisions are generally two in number ; in asarabacca, the stigma is deeply cut into six parts, and in turnera, more slightly into a greater number.

The number of styles is to be reckoned from their immediate insertion into the seed-bud. Whatever divisions are above that insertion, are only segments of the style or stigma. Without attending to this distinction, we might frequently be apt to refer certain genera of plants, from a superficial view of the number of their styles, to an improper order in Linnæus's Method, the secondary divisions of which are derived from the number of styles, reckoned, as we have said, from their insertion into the seed-bud.

In flowers which have no style, the stigma adheres to the seed-bud ; and its number, like that of the styles, serves as a foundation to the orders in the Linnæan Method of arrangement. Thus poppy, prickly poppy, celandine, may-apple, herb-christopher, caper, and water-lily, which have a single stigma, are referred to an order of plants having one style, although the style in these plants be totally wanting.

With respect to duration, the stigma generally withers without falling off ; in poppy, water-lily, and side-saddle-flower, it is permanent.

The surface of the stigma is covered with a clammy moisture, which serves to dissolve the particles of the fertilizing dust of the anthers, and thereby more easily transmit its effluvia and essence, which Linnæus calls the *aura feminalis*,

to the seeds below. The experiments of Jussieu, Vaillant, and Needham, have left no room for doubt on this matter.

The stigma, when single, generally terminates the style. When there are several *stigmata*, as in cotton, and most of the liliaceous plants, they are disposed with admirable symmetry along its sides. In American *viburnum*, *petrea*, and *lippia*, the *stigma*, which is single, is placed upon the side of the style, or rather obliquely on its extremity.

STIMULI, stings; a species of armature or offensive weapon, with which some plants, as nettle, *cassida*, *acalypha*, and *tragia* are furnished. Their use, says Linnæus, is, by their venomous punctures, to keep off naked animals that would approach to hurt them.

STIPES properly signifies the trunk of a tree. By Linnæus it is used to denote the trunk of the mushrooms, the base of the footstalk in the fern and palm tribes, as likewise the slender thread, which, in many of the compound flowers, elevates the feathery or hairy crown (*pappus*) with which the seeds are furnished, and connects it with the seed. The appearance in question is conspicuous in gum-fuccory, dandelion, bastard hawk-weed, *seriola*, *hypochoeris*, colt's-foot, and some species of wild lettuce.

STIPULA, (straw, stubble); one of the *fulcra* or supports of plants, defined by Linnæus to be a scale or small leaf, stationed on each side the base of the foot-stalks of the flower and leaves at their first appearance, for the purpose of support. Elmgren restricts it to the foot-stalks of the leaves only

Malpighi was the first who made observations on the number, figure and situation of this auxiliary part of the plant. Linnæus has improved upon Malpighi's observations, and called in the *stipulae* as essential characters in discriminating the species.

The appearance in question is conspicuous in tamarind, cassia, rose, honey-flower, tulip-tree, apricot, peach, bird-cherry, and the pea-bloom flowers.

Stipulae exhibit the same variety in form and structure as the leaves, at whose insertion they are frequently placed.

The

The greater number of plants have two *stipules*, one on each side of the foot-stalk : in the African species of honey-flower and butcher's broom, there is only a single scale of this kind, which, in the former, is placed on the inside, in the latter, on the outside of the stalk.

With respect to duration, some *stipulæ* fall before the leaves, as in cherry, bird-cherry, almond, poplar, lime, elm, oak, beech, horn-beam, hazel-nut, birch, alder, fig, and mulberry : others are permanent, or continue till the fall of the leaves, as in rose, raspberry, strawberry, cinquefoil, tormentil, avens, and the pea-bloom flowers.

In most plants the *stipulæ* are detached from the stalk : in rose, cinquefoil, *comarum*, raspberry, and honey-flower, they grow close to the plant.

In fig and mulberry-trees, the *stipulæ* are produced on the inside of the leaves : in birch, lime, and the pea-bloom flowers, on the outside ; in platanus, they form a sort of ruff, which surrounds the branches.

Lastly, in the lipped, and cross-shaped flowers of Tournefort, the rough-leaved and starry plants of Ray, the natural order *orchideæ*, the liliaceous plants, and several of the compound flowers, the *stipulæ* or scales in question are wanting.

The *stipulæ* frequently afford excellent marks of distinction in discriminating the species. Thus, the African and Ethiopian species of honey-flower are essentially distinguished from one another by the number and situation of the *stipulæ* ; which, in the former, are single, and grow close to the stalk : in the latter, double, and detached from it. In like manner, the kidney-shaped, and bearded or hairy *stipulæ* of *caссия auriculata* distinguish that species from all its congeners.

STROBILUS, (properly a pine-apple, as likewise an artichoke, which in figure resembles it) ;—in the modern botanical nomenclature, a cone ; a species of seed-vessel composed of woody scales, which are placed against one another, and split only at top, being fixed below to an axis which occupies the centre of the cone. The term is exemplified in pine, fir, cypress, and the other cone-bearing

ing plants, whose habit and structure are particularly described under the article CONIFERÆ, which see.

STRUCTURA vegetabilis. The structure or internal organisation of plants:

The organisation and internal structure of the different parts of vegetables, such as the stems and branches, the leaves, the calyx, the petals, and seeds, is not exactly the same; in some they are formed of two or three, in others of all the simple organical parts contained in the bark and wood of the stem, in which the organisation is most apparent.

The bark of the trunk is composed of four similar parts; viz. I. the epidermis, cuticle or scarf-skin, which infolds the beds of the bark. II. Vessels containing the sap. III. Vessels containing the blood or proper juice of the plant. IV. The cellular web or tissue.

I. The epidermis is a very fine membranous substance spread over the bark, and is always transparent and elastic; without colour or any sensible organisation, some very small pores excepted, which are sometimes discovered in its substance, and probably serve the double purpose of throwing off the superfluous nourishment, and imbibing new.

II. The sap-vessels are woody longitudinal fibres, which are hollow, and almost inconceivably fine. They are devoid of ramifications, and so situated, with respect to one another, as to form a web of several bundles in form of a net, the meshes of which are longer than broad. These small bundles are the true vegetable muscles, and differ in their figure from those of animals, which are formed of large masses of fibres accumulated one above another.

III. The proper vessels, called likewise, from their use, vegetable blood-vessels, are straight longitudinal fibres, larger than the sap-vessels, and less numerous. They are filled with the proper juice, which is generally coloured, and is, in fact, the blood of the plant. Of this kind is the milk of spurge, dog's-bane, and fig, the yellow juice of celandine, the resin of fir and pine-trees, and the mucilage of plants of the mallow tribe.

IV. The

IV. The cellular web, or tissue, is an assemblage of little bladders, without any sensible communication, which fill the interstices of the net formed by the sap-vessels, and traverse the whole substance of the bark and wood; from the pith, or medullary substance in the centre, of which it is only a prolongation, to the epidermis or skin of the bark, where it is much slenderer than towards the centre of the wood.

The substance in question is distinguished by different names from the structure of the parts in which it is found. When contained in the small meshes of the woody longitudinal fibres or sap-vessels of the trunks and roots of trees, it is termed, as we have said, the cellular tissue; when collected into larger voids, formed by meshes that are placed more remote from each other, as in the leaves, it takes the name of parenchyma; when it forms a bed betwixt the epidermis, and the beds of the bark, as happens in the bark of herbs, and of the young branches of trees, it is termed the cellular cover: and when collected in the heart of the plant within the wood, is known by the name of the pith, marrow, or medullary substance.

In its state of parenchyma and cellular cover, each bladder is of a deep green colour, herbaceous and succulent.

The pith, as we have just observed, is only a modification of the cellular tissue. This appears from its originally assuming the exact form, colour, and consistence of that substance. Thus, the pith of all the new productions of trees consists of a number of oval, green, and succulent bladders, exactly like those of the bark and wood; and it is not till the end of one or two years, that these bladders become empty, dry up, assume a spherical form, and finally take the consistence and colour of pith, which, in the greater number of plants, is white; in some, as horse-chestnut, yellow, or rust-coloured; in others, as walnut, brown; and in others, red.

The principal seat of the pith in those plants which abound in it, is in the heart of the lignous body, where it is contained as in a tube, which serves to diffuse it into the substance of the wood and bark. Herbs and shrubs have, in

general, a greater quantity of pith than trees. In elm, oak, hazel, pear and apple-trees, there is scarce any pith; in guaiacum, ebony, iron-wood, and the roots of tobacco, and thorn-apple, it is entirely wanting. Walnut, holly, ash and pine, have but an inconsiderable quantity: elder-tree, hawthorn, fig-tree, sumach, and wormwood, produce it in great abundance.

Notwithstanding its thickness, the pith in the heart of trees disappears insensibly; the canal which contains it, as the plant waxes old, contracts itself by degrees, and the loss of pith is supplied by the enlarged dimensions of the sap and blood-vessels which traverse its substance, although less sensible to observation in its state of pith. It is doubtless these vessels, at first insensible, which furnish the turpentine that oozes from the pith of pine and fir trees.

The bladders of the medullary substance are larger in the centre than towards the body of the wood; and it is observed in general, that those herbs which have the greatest quantity of pith have likewise the largest bladders. The same does not hold in trees. Elder-tree has a great quantity of pith, yet very small bladders.

The innermost part of the bark, or that which is next the wood, is termed *liber*, from its fine and thin plates resembling the leaves of a book.

The wood, or lignous body, is composed of the same constituent parts as the bark, except the epidermis, which, in that body, is supplied by the bark itself. It likewise possesses a fourth part, or series of vessels, not to be found in the bark. These are the tracheæ, or vessels which receive and transmit the air necessary for preparing and giving motion to the humours.

The tracheæ, or air vessels, are tubes formed of elastic plates twisted spirally in a direction contrary to the apparent diurnal motion of the sun. These tubes are of larger diameter than all the other vessels that are found in the wood, or bark, even those containing the proper juice or blood of the plant, and, according to the observation of Malpighi, are larger in the roots than in the trunk.

The lignous beds are, at first, soft and tender, and acquire solidity only by degrees. They form so many concentric circles or rings, the outermost of which, or those next the bark, being of later production, are softer and less coloured than those which are lodged nearer the centre. It is these innermost beds that form the body of the wood properly so called : the outer beds, which are of a much softer texture, and frequently of a different colour, being called *albumum*, which is only another term for tender imperfect wood, that has not yet acquired its ultimate degree of solidity. This substance is only found in the hard woods, such as ebony, pomegranate, oak, and pine-trees. In the soft woods, on the contrary, which never acquire any great degree of solidity, such as baobab, silk-cotton tree, lime-tree, aspen, alder, and birch, there is no *albumum*, or, perhaps, to speak more properly, there is no wood ; the lignous body remaining always in its first state of *albumum*, without acquiring any further degree of solidity.

Such, in general, is the organisation of vegetables, which in no part is so conspicuous as in the stem. The same organisation, according to Grew, obtains in every part of the plant, as the root, leaves, and each, even the minutest, part of fructification. More recent experiments on this subject seem, however, to evince, that the structure of all the parts is not exactly the same ; a few of the constituent parts of the stem being entirely wanting in some of the other parts.

The external parts of plants are by some modern naturalists denominated productions and terminations of the internal. The leaves, *bractææ*, and calyx, are considered by such authors as prolongations of the coarse outer bark ; the petals and stamina of the liber or fine inner bark ; the *pistillum* of the pith. The wood is, in some sort, the skeleton or mass of bones which preserves all these parts in their place, and concurs with them in performing the vital functions. Hence in the opinion of these authors, the bark and pith constitute the essence of the vegetable body.

Notwithstanding these assertions, it is certain that the organisation of the leaves is nearly the same with that of the stem.

S T Y

stem. They are, in fact, a sort of flat compressed stems, composed, like the part last mentioned, of an epidermis, a cortical body on both sides, and a lignous body in the centre. They differ only in two particulars: 1, That their epidermis, or scarf-skin, is furnished with a number of cortical glands, which, in herbaceous vegetables, are lodged on both surfaces; in trees, on the under surface only. 2, That the cellular tissue or parenchymatous substance is found in much greater abundance in the leaves than stems of plants, and is always green and succulent, never passing into the state of pith.

The calyx, or external cover of the flowers, which is generally green, does not differ sensibly in its organisation from the leaves, unless that it frequently wants the lignous body.

The petals seem almost entirely composed of *tracheæ*, or air-vessels. They want the cortical glands in their epidermis, which are found on the surface of the leaves and flower-cups.

For further observations on the anatomy of plants, the reader is referred to the works of Grew, Malpighi, and Duhamel, who have handled this curious subject with the utmost accuracy and minuteness.

STYLUS, the style; the slender part of the *pistillum* or female organ, resembling a pillar, and corresponding to the *vagina* in animals, which stands upon the seed-bud, and elevates the *stigma*.

The number of styles, generally speaking, is equal to that of the seed-buds, each seed-bud being furnished with its own particular style. The compound flowers, cone-bearing plants, rose, ranunculus, tulip-tree, and many other plants, evince this to be their natural structure.

There are, however, plants which have more than one style for a single seed-bud, as the umbelliferous plants; and there are others, which, on the contrary, have a single style common to many seed-buds, as the rough-leaved plants and most of the lipped-flowers. In a third set of plants which seem to form a medium betwixt the two former, the style is single

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at its origin, but soon branches out into as many ramifications as there are cells in the cavity of the seed-bud. Of this kind are the plants of the geranium and mallow tribes, which have their styles divided above into five branches, corresponding to the five divisions of the seed-bud or capsule.

The divisions or branches just mentioned are either two in number, as in *perficaria*, *cornutia*, and *sebesten*, in which last the style is forked, each of the two branches being subdivided into two; three, as in *clethra* and *frankenja*; four, as in *buckthorn* and *alaternus*; or five, as in *Syrian mallow*.

The number of styles, and in their absence, of *stigmata*, serves as a foundation to most of the orders or secondary divisions in the sexual method.

With respect to figure, the style is either cylindrical and hollow like a tube, as in most plants; angular, as in *Indian flowering-reed* and some *liliaceous* plants; awl-shaped, as in *geranium*; slender like a hair, as in *ceratocarpus*; or club-shaped above, as in *greater snow-drop*.

In point of proportion and dimensions, the style is either of the length of the *stamina*, as in *tobacco*, and most plants; very long, as in *tamarind*, *cassia*, *campanula*, *viper's-grass*, *Turkey-wheat*, and the nodding or drooping flowers, as *snow-drop* and *fritillaria*; very short, as in *dog's bane*, *red jessamine*, and most of the other plants of the natural order, *contortæ*; thicker than the *stamina*, as in *greater snow-drop*; of equal thickness, as in *dead-nettle*; or slenderer, as in *ceratocarpus*.

In the greater number of plants, the style is seated upon the summit of the seed-bud; in *rose*, *raspberry*, *strawberry*, *cinque-foil*, *tormentil*, *avens*, *dryas*, and *marsh-cinque-foil*, the styles, which are numerous, issue from within the side of their respective seed-buds. In *suriana*, *hirtella*, *ladies-mantle*, *percevier*, and *cocoa-plum*, they are frequently produced at the base of the seed-bud: and in *caper* and *burning-thorny-plant* they stand both above and below it.

With respect to duration, the style either falls with the other parts of the flower, as in most plants: or accompanies

the fruit to its maturity, as in the cross-shaped flowers, the *tetradynamia* of the sexual method.

SUCCULENTÆ (*succus*, juice) the name of the thirteenth order in Linnæus's fragments of a natural method, consisting of flat, fleshy, succulent plants, most of which are evergreen.

List of the Genera contained in this Order.

Linnæan Genera.		English Names.	
α	<i>Aizoon.</i>		
	<i>Cactus,</i>	— —	Melon-thistle, torch-thistle, Indian-fig.
	<i>Galenia.</i>		
	<i>Mesembryanthemum,</i>	—	Fig-marigold.
	<i>Neurada.</i>		
	<i>Reaumuria.</i>		
	<i>Tamarix,</i>	— —	Tamarisk.
	<i>Tetragonia.</i>		
β	<i>Cotyledon,</i>	— —	Navel-wort,
	<i>Crassula,</i>	— —	Lesser orpine.
	<i>Penthorum.</i>		
	<i>Rhodiola,</i>	— —	Rose-root.
	<i>Sedum,</i>	— —	Lesser house-leek, stone-crop,
	<i>Sempervivum,</i>	— —	House-leek.
	<i>Septas.</i>		
	<i>Suriana.</i>		
	<i>Tillæa,</i>	— —	Small annual house-leek,
γ	<i>Claytonia.</i>		
	<i>Nama.</i>		
	<i>Portulaca,</i>	— —	Purslain,
	<i>Sesuvium.</i>		
	<i>Trianthema,</i>	— —	Horse-purslain.
δ	<i>Adaxa,</i>	— —	Tuberous moschatel, or hol- low-root.
	<i>Chrysosplenium,</i>	— —	Golden saxifrage.
	<i>Hydrangea.</i>		
	<i>Mitella,</i>	— —	Bastard American sanicle.
	<i>Saxifraga,</i>	— —	Saxifrage.
	<i>Tiarella.</i>		

I decline entering into the characters of this numerous order, as I cannot regard it in any other light than as an assemblage of two or three natural orders, the characters of which ought, therefore, to be preserved distinct.—The succulent plants are refreshing, astringent, and of very wholesome use.

The leaves of purslain are used in fallads, as are likewise the berries of the opuntias (*Cactus*).

The fruit of tamarisk is astringent, and used in hæmorrhages.

The juice of the leaves of house-leek is an excellent cosmetic.

Galenia has a warm, poignant, and somewhat aromatic taste resembling pepper, which, however exceeds it in strength.

Externally, the leaves of purslain are successfully employed in St. Anthony's fire, and other inflammations of the skin. The Americans apply the cereus's or torch-thistles, to promote the union of fractured bones.

From the *anacampseros purpurea* of Bauhin, the *sedum foliis planiusculis* of Linnæus, is procured by maceration, a water, which is reckoned by the Siberians an excellent vulnerary, and in such estimation, says Gmelin, that they scruple not to believe it endued with the singular virtue of raising the dead to life.

Indian-fig, the *cactus ficus Indica* of Linnæus, has no stem. The leaves, which are fleshy, thick, and oval, grow out of one another as by joints. At the summit of the leaf issues the flower. The plant does not rise high, and in some sort creeps. The bristly spines or prickles, with which the leaves are armed, harden as the plant increases in age. Indian-fig is refreshing, and stains the urine of such as use it internally of a red colour.

The cochineal shrub is the *cactus cochinillifer* of Linnæus. The leaves are two fingers thick, of a beautiful green, and very prickly. The flowers are of a pale rose-colour, and succeeded by a fig-like fruit, which, when ripe, is full of a deep purple pulp, containing a number of very small flat

rough seeds that are as red as blood within. Upon this plant, which is a native of Mexico and the West-India Islands, is found the insect or bug called cochineal, which is used by the dyers as their principal basis for the scarlet colour. It is a six-legged viviparous insect, the female of which is only used. This is produced from the egg in its perfect form, and undergoes no transformation afterwards. It has no wings, nor, indeed, has it use for any, the greatest part of its life being spent on the vegetable whereon it feeds. Father Plumier was the first who corrected the mistaken notion, which had long universally prevailed, of its being a vegetable production; M. de Reaumur first explored with accuracy its natural history and origin.

SUCCUS. The juices of plants.

The vegetable juices or fluids are generally reduced to two; the lymph or sap; and the blood or proper juice. It appears, however, that plants contain many other fluids; for in a single fruit, such as a pine-apple, orange or strawberry, we can distinguish by the taste and smell three or four other liquors, of which we can discover but very feeble vestiges in the other parts of these plants.

The sap or lymph, is a simple fluid, without colour or smell, and little different from water. It may be compared to the chyle in the animal œconomy, as may the roots which absorb and prepare it to the lacteals. It is purified, as the blood of animals, by perspiration.

That the sap or lymph ascends from the root to the stem, branches, leaves, and even the minutest parts of the fructification, is past a doubt. But whether the sap so diffused to the extremities of the plant ever returns, and there is in plants, a circulation of sap, analogous to that of the blood in animals, is a question which will probably never receive a satisfactory answer, as the data required for its solution are exceedingly numerous, and almost without our reach, and conjecture almost the only evidence of which the subject is susceptible. The two hypotheses, however, of the circulation of the sap, and the perspiration of plants, are very far from being opposite in their nature and result, as is generally imagined;

imagined; but, on the contrary, are perfectly compatible with each other.

By the accurate experiments of M. Bonnet, it appears that the sap ascends, not by the bark, but by the fibres of the wood: and the curious observations of Grew, Duhamel, and other naturalists, render it highly probable that the fluid which ascends by the fibres of the wood, descends to the roots by the cortical fibres that are most contiguous to the wood. In support of this conclusion, it has been observed, that upon a transverse incision being made into the trunk of a tree, the juice, which is expended, or flows from the wound, proceeds in greater quantities from the upper lip, where the swelling likewise is much larger than below. It appears, however, that when two similar incisions are made, one at the top of the tree, and another near the root, the latter expends much more sap than the former. The return of the sap from the extremity of the branches to the roots being, by the result of such experiments, rendered somewhat more than probable, it remains that we establish the mode of its return, and ascertain its analogy, or want of analogy, to the circulation of the blood in animals. It is here that certainty fails us, and vague conjecture must supply its place. Before any thing satisfactory can be expected on this head, we must previously determine, whether the liquor which descends from the branches by the bark, be the same as that which ascends from the root by the wood; and next discover the anastomoses or joinings of both series of vessels, in other words, the communication betwixt the cortical and lignous fibres:—a *desideratum* which, if we may reason by analogy, will not be obtained without the utmost difficulty, since, with the assistance of injections, we have not yet been able to discover but obscurely the anastomoses of the veins and arteries in the animal system.

In spring, the sap is found in greatest abundance, and then the bark is easily detached from the wood. On the contrary, when the sap-season is past, the bark is found closely applied, and, as it were, glued to the wood. The leaves contribute greatly both to the abundance and motion
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of the sap. If a tree, when high in sap, is divested of its leaves, the bark, in a few days, will adhere as closely to the wood as in winter.

The other sort of fluid contained in plants is denominated the proper juice, and is analogous to the blood in animals. It is a compound liquor, and is easily distinguished by its colour, smell, or substance from the lymph or sap.

This fluid is either green, as in periwinkle; white, as in spurge, fig-tree, and dog's-bane; yellow, as in celandine; red, as in log-wood, and dragon's-blood; mucilaginous or gummy, as in the jujube and mallow-tribes; or resinous, as in the cone-bearing plants. It is from this variety in colour and substance, that the liquor in question is called the proper juice; each species of plant being supposed to contain a fluid which is proper and peculiar to it.

In this blood or proper juice reside the smell, taste, and virtue of the plants. In fact, those plants possess little virtue, in which there is either a superabundance of sap, or a poverty of blood. It is the juice which flows from the poppy that is narcotick; the corrosive quality of celandine and spurge resides in the same fluid; the purgative virtue of jalap in its resin. Barks possess more virtue than woods, because the blood-vessels of the former are thicker and larger than those of the latter.

The blood or proper juice is contained in tubes which are larger than the lymphatic or sap-vessels, and although diffused through the whole substance of the plant, are collected in greater abundance in the bark. In fir-trees, the turpentine, which is the proper juice, is amassed in the parenchymatous substance, immediately under the epidermis or skin of the bark: in juniper, the sandarac is collected betwixt the bark and the wood: in the larch-tree, the turpentine which it produces is accumulated in the body of the wood: in pine, it exsudes from the bark, from betwixt the wood and bark, from the wood itself, and from the pith.

For further particulars on this interesting physiological subject, the reader is referred to M. Duhamel's *Traité des Arbres*,

Arbres, Dr. Grew's Anatomy of Plants, and the works of the ingenious M. Bonnet of Geneva.

SYNGENESIA (*συν*, together, and *γενεσις*, generation) the name of the nineteenth class in Linnæus's Sexual Method, consisting of plants in which the *anthers* or male organs of generation are united into a cylinder, the filaments on which they are supported being separate and distinct.

This class contains the numerous tribe of compound flowers, whose general characters were enumerated under the article *COMPOSITUS flos*.

The orders or secondary divisions of the class *Syngenesiâ* arise from the different modes of intercommunication of the florets or lesser partial flowers contained within the common calyx. This intercommunication, which Linnæus, from a love to analogies, terms the *POLYGAMY OF FLOWERS*, admits of the four following cases.

I. The florets all hermaphrodite.

II. Hermaphrodites and females.

III. Hermaphrodites and florets of no sex or neuter.

IV. Males and females.

When the florets are all hermaphrodite, as in the first case, the polygamy is said to be equal, and the compound flowers so characterized are referred to the order *Polygamia Æqualis*, expressive of that circumstance. This order contains the semisfloscular, and many of the sfloscular, compound flowers of Tournefort. Among the former are dandelion, sow-thistle, lettuce, succory, goat's beard, nipple-wort, and hawk-weed; among the latter, burdock, saw-wort, thistle, artichoke, hemp-agrimony, goldylocks, and Lavender-cotton. This order contains no radiated flowers.

In the second case, the florets in the centre or disk are hermaphrodite; those of the circumference, margin, or radius, female, that is, want the *stamina* or male organs. This sort of intercommunication Linnæus terms *polygamia superflua*, useless or superfluous polygamy, because the impregnation of the female florets in the circumference is unnecessary, the fructification being perfected in those of the centre. The flowers which are referred to this order are
either

either floscular, that is, composed entirely of hollow florets; or radiated. Among the former are tanfy, wormwood, cud-weed, and flower-everlasting; among the latter, colt's-foot, groundfel, aster, golden-rod, elecampane, daisy, feverfew, milfoil, and African marigold.

In the third case, the hollow florets in the centre are hermaphrodite; the flat ones in the circumference, neuter, that is, want both male and female organs. This kind of polygamy is termed properly enough *ineffectual* (*polygamia frustranea*) as the florets in the circumference being of no sex are totally ineffectual to the fructification. The order in question contains only six genera: viz. sun-flower, dwarf-sun-flower, tickseeded sun-flower, *gorteria*, *osmites*, and centaury.

In the last case, the florets of the centre or disk are male, and those of the circumference, female. This sort of polygamy is termed, *necessary* (*polygamia necessaria*) because none of the florets being hermaphrodite, the presence of male and female florets is absolutely necessary for perfecting the fructification. Marigold, arctotis, African ragwort, hard-seeded chrysanthemum, cotton-weed, (*filago*) and bastard cud-weed, furnish examples. The flowers of this order are mostly radiated.

Besides the four orders just mentioned, the class *syngenesia* contains two others. These are *polygamia segregata*, and *monogamia*.

The first derives its name from the florets being *separated* from one another by means of partial flower-cups, which support one or more florets, and are placed within the common calyx. This order furnishes no distinct case of polygamy, and is, in fact, only a modification of the first case; the florets so separated being all hermaphrodite, except in the genus *sphaeranthus*, which having hermaphrodite florets in the centre, and female florets in the margin, is referred to that particular species of polygamy which we denominated *superfluous*.

The genera in this order are five in number; viz. elephant's-foot, globe-flower, globe-thistle, *guzdelia*, and bastard Ethiopian

Ethiopian elichrysum. The first has four florets in each partial flower-cup; the second has an indefinite number; the three last only one.

The order *monogamia* contains simple flowers. The term signifies a single marriage, and is placed in direct opposition to the polygamy or intercommunication of florets, which so conspicuously characterizes the other orders. In fact, balsam, violet, cardinal flower, and the other plants of this order, agree with the compound flowers in scarce a single circumstance, save the classical character, the union of the *anthers* or tops of the *stamina*:—a circumstance which, whilst it undeniably confutes Linnæus's assertion, that, in that union consists the essence of a compound flower, serves likewise to demonstrate the imperfection of his artificial character. Former botanists had sought for the essential character of this numerous tribe of plants in the common calyx and common receptacle. Both these Linnæus rejects as inadequate, and in their place substitutes the union of the *anthers* and situation of the seeds. That union, we have seen, is not peculiar to compound flowers; it is to be found in violet, balsam, cardinal-flower, sheep-scabious, and some other flowers, confessedly simple. To this it will be answered, that Linnæus's assertion is different from what I have represented it: that the author in question, so far from affirming that the union of the *anthers* constitutes, of itself, the essence of compound flowers, has combined that circumstance with the situation of the seeds, and declared that the essence of a compound flower consists in having the anthers united into a cylinder, and a single seed placed under each floret. This argument is plausible, but not solid, for unluckily three of the genera of the order *monogamia*, viz. *Strumpfia*, *seriphium*, and *corymbium*, besides the united anthers, have likewise a single seed placed under the receptacle of the flower, and yet the order *monogamia* contains simple flowers only. The fact is, that compound flowers are so remarkably different in their port and external appearance from those termed simple, that it is unnecessary to seek for an essential character where there is no danger of confusion.

Aggregate

Aggregate and compound flowers have indeed a greater conformity in point of habit; yet a superficial attention only is requisite to discover very material differences in their structure.

As the excellence of the artificial character is constituted by its approximation to the natural, it is evident that a character, which arranges together things that are absolutely heterogeneous, and possess no natural relations, is imperfect and erroneous. Compound flowers are confessedly a natural tribe of plants. Simple flowers possess no relations in common with them, that can justify a junction. A character, therefore, which, like that of Linnæus, blends simple and compound flowers promiscuously together, offers a manifest violence to Nature, by forcibly tearing many genera of plants from their proper place, and incorporating them with others which are of a different and even opposite nature. In fact, in all the numerous systems in botany, there is not a single character, which wounds Nature so cruelly as that of Linnæus, in the instance just given.

By an ingenious writer, Dr. Barton of Philadelphia, who has lately published an Elementary Treatise on Botany, the author of the present work, which the learned Professor has honoured with repeated marks of peculiar notice and distinction, is, notwithstanding, under the article before us, charged with an inconsistent departure from his usual tenets, for asserting, that "the genus *Kuhnia*, although very nearly allied to hemp-agrimony, and indeed, "in every other respect, like a compound flower, is *very* "properly referred by Linnæus to a class containing simple "flowers, (*pentandria*) because the anthers are separate and "distinct." *Vide* COMPOSITUS *flos*. As there is no imputation which, in matters of science, it becomes a man more sedulously to avoid, than that of inconsistency, so neither is there any which, when charged without due consideration, he ought with greater solicitude to repel. Dr.
Barton's

Barton's misconception in the instance just mentioned, (for a misconception, I trust, I shall evidently prove it) may have probably arisen from his overlooking a distinction which, in appreciating the merits of any particular system, that of Linnæus for example, it is ever necessary to make between the precise portion of approbation which may be justly claimed by its founder, on account of the degree of strictness in his adherence to the principles of his Method, be those principles what they may, and that which belongs to him from the comparative excellence of the artificial character, which is always in the direct ratio of its nearer approach to the order of nature.—In this view, as is manifest, the same writer may, in one respect, be the object of merited censure, and in another, that of equally merited applause. To the honour indeed of a rigidly uniform adherence to the principles of his system, (an honour almost exclusively due to Rivinus) Linnæus, it is true, has but slender pretensions: and some very remarkable deviations from the simplicity of his plan have been occasionally enumerated in the course of this work. In general, however, he has the praise of uniformity: and, as he professes not in his Sexual Method to investigate the Order of Nature, it can be no reproach, that, in order to conduct the learner with greater facility to the knowledge of plants, which is the principal business of an artificial character, he has, with the exceptions just mentioned, commonly adhered to the principles of his method, sacrificing to utility even nature itself, by declining to arrange certain genera under classes to which, however connected with their congeners by external habit, and other natural affinities, the mere novice in botany, for whose use every artificial system is intended, could not, for want of the classical character, be ever led to refer them. I conceive myself, therefore, perfectly justified, and strictly consistent with the general tenor of the doctrines of the Botanical Dictionary, and my other works respecting the comparative excellence of the artificial character of Linnæus, as explained above, (doctrines which I have ever maintained, and yet see no reason to retract) when I assert that Linnæus

has

has with the utmost propriety referred the genus *Kuhnia*, which, in a *Natural* Method would, no doubt, without any effort, from its general appearance, have arranged itself with the *compound flowers*, to the class *pentandria* of his *artificial* method, containing *simple flowers*, in which it with equal facility assumes its place, bearing as it does five stamina or male organs of fecundation, separate both in their anthers and filaments, the special distinctive character of the class. For the same reason, Linnæus is not to be blamed, but defended, for placing violet, balsam, and other simple flowers, with the compound, in the class *syngenesia* considered as part of an *artificial* method, because they as undoubtedly possess the classical character, the union of their five stamina by the anthers, as the compound flowers with which, however unnaturally, they are thus made to incorporate.—In short, the genus *Kuhnia* could not, but with impropriety, have been transferred to the compound flowers in Linnæus's system, constituted as the class *syngenesia* which contains them now is; nor could the celebrated Swedish Naturalist, without an entire alteration of the principles of his method, have removed violet and its congeners from the place which they now occupy therein. Still, however; much as we commend his general adherence to the artificial character which he has chosen, we deny its excellence, nay, regret that, in the formation of his system, he should have adopted it at all—a character which, by the superstructure of which it is the basis, he himself has demonstrated, could not be carried to its utmost extent, without, in a thousand instances, producing junctions and separations, which, doing violence to nature, must, for that reason, greatly diminish the value of the principle from which they proceed.

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TETRADYNAMIA (τεσσαρες, four, and δυναμις, power) four powers; the name of the fifteenth class in Linnæus's Sexual System, consisting of plants with hermaphrodite

dite flowers having six stamina, four of which are longer than the rest. It corresponds to the *siliquosæ* of Ray, and *cruciformes* of Tournefort, and, abating a single genus, *cleome*, is a true natural family, the particular characters of which are enumerated under the article *siliquosæ*, by which name Linnæus, after Ray, has distinguished these plants in his Fragments of a Natural Method. *Vide SILIQUOSÆ.*

The orders in the class *tetradynamia*, which are two in number, are likewise borrowed from the same author. Such as have a long pod, as flock, rocket, and ladies smock, being termed *siliquosæ*; those which have a short round one, as scurvy-grass, candy-tuft, and satin-flower, *siliculosæ*. I have observed the same distinction in subdividing the natural order *siliquosæ*.

In most species of bastard-mustard (*cleome*) the stamina are attached to a long pillar-shaped foot-stalk resembling a style, which supports the seed-bud; a circumstance which ought to have determined that genus to the class *gynandria* in the Sexual Method, upon the same principle, by which passion-flower and several other genera are made to arrange themselves under that class. The genus *cleome* indeed, whatever may be its pretensions to a place in the class alluded to, has certainly no right to that which it at present holds in the class *tetradynamia* of the same method; as, besides its wanting the classical artificial character, the inequality of the stamina, these male organs of generation are frequently more than six, the number to which plants of this class are restricted. In fact, *cleome* is among the most striking instances of Linnæus's deviation from his own principles; since scarce a circumstance, except the presence of what he calls nectariferous glands, which, by the way, are very seldom to be discovered even with glasses, can possibly connect it with the plants among which he has arranged it.

TETRAGYNIA (*τετραγες*, four; and *γυνή*, a woman,) the name of an order or secondary division in the 4th, 5th, 6th, 8th, and 13th classes in the Sexual System; consisting of plants, which, to the classic character, whatever it is, add the circumstance of having four styles or

female organs. Herb-paris and grass-of-Parnassus, furnish examples.

TETRANDRIA (*τετραγες*, four; and *ανηρ*, a man or husband) the name of the fourth class in Linnæus's Sexual System, consisting of plants with hermaphrodite flowers, which have four stamina or male organs that are of equal length. In this last circumstance consists the main difference, according to Linnæus, between the plants of the class in question and those of the 14th class, *didynamia*, in which the four stamina are of unequal length, two of them being longer than the other two.

The orders in this numerous class are three, founded upon the number of styles or female organs.

Scabious, teasel, barren-wort, the starry plants of Ray, and the greater number of genera in this class, have one style.

Dodder, and hyssop, have two styles.

Holly, and a few others, have four.

TETRANGIÆ (*τετραγες*, four; and *αγγος*, a vessel) the name of the eighteenth class in Boerhaave's Method, consisting of herbaceous plants having two seed-leaves, with a single capsule that is divided internally into four cells. It is exemplified in rue and thorn-apple.

THALAMUS, a bride-chamber; Vaillant's name for the *receptaculum* of Pontedera and Linnæus; the *sedes* of Ray; and *placenta* of Boerhaave.

Linnæus terms the calyx the *thalamus* of the flower.

THYRSUS, (properly a spear wrapped about with ivy or bay-leaves, carried by the votaries of Bacchus at his feasts). In the modern nomenclature of botany, a mode of flowering resembling the cone of a pine. It is, says Linnæus, a panicle contracted into an oval or egg-shaped form. The lower foot-stalks, which are longer, extend horizontally, whilst the upper ones are shorter and mount vertically. Lilac and butter-burr furnish examples.

TOMENTUM, short wool; a species of hoary, or downy pubescence, which covers the surface of many plants, particularly

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particularly those in the neighbourhood of the sea, and such as, in their native soil, are exposed to the ravages of bleak and violent winds. The substance in question consists of a number of small hairs, that are so closely interwoven as scarcely to be distinguished by the naked eye; the white appearance arising from their aggregation and compact texture. *Cerastium tomentosum*, medicago, and a species of marjoram and speedwell, furnish examples.

TRACHEÆ, air-vessels of plants. *Vide* STRUCTURA VEGETABILIS.

TRIANDRIA, (τρεῖς, three; and ἀνὴρ, a man or husband) the name of the third class in Linnæus's Sexual System, consisting of plants with hermaphrodite flowers; which have three stamina or male organs.

The orders in this class are three, derived from the number of styles or female organs.

Valerian, tamarind, and many others, have one style.

The grasses, which constitute the second order, have two styles.

Eriocaulon, montia, and some others, have three.

TRIANGIÆ (τρεῖς, three; and ἄγλος, a vessel) the name of the seventeenth class in Boerhaave's Method, consisting of herbaceous plants having two seed-leaves, with a single capsule that is divided internally into three cells. It is exemplified in St. John's wort, violet, campanula, palmar-christi, mercury, spurge, and cardinal-flower.

Tulip, narcissus, iris, and several other plants which have their seed-vessel divided into three cells, do not arrange themselves under the class *triangiæ*, because the seeds rise with a single leaf. Such plants constitute the twenty-eighth class, *bracteata*, of the same author.

TRICOCCÆ, (τρεῖς, three; and κοκκος, a grain) the name of the thirty-eighth order in Linnæus's Fragments of a Natural Method, consisting of plants with a single three-cornered capsule, having three cells or internal divisions, each containing a single seed. The single seed-vessel of these plants is of a singular form, and resembles three capsules.

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which adhere to one common foot-stalk as to a centre, but are divided externally into three pretty deep partitions.

List of the Genera contained in this Order.

Linnæan Genera.	English Names.	
<i>Acalypha.</i>		
<i>Adelia.</i>		
<i>Andrachne,</i>	—	Bastard-orpine.
<i>Buxus,</i>	—	Box-tree.
<i>Cambogia.</i>		
<i>Carica,</i>	—	Papaw.
<i>Cliffortia.</i>		
<i>Clutia.</i>		
<i>Cneorum,</i>	—	Widow-wail.
<i>Croton,</i>	—	Bastard-ricinus, Tallow-tree.
<i>Cupania.</i>		
<i>Dalechampia.</i>		
<i>Euphorbia,</i>	—	Burning thorny plant, spurge.
<i>Excoecaria.</i>		
<i>Guettarda.</i>		
<i>Hernandia,</i>	—	Jack-in-a-box.
<i>Hippomane,</i>	—	Manchineel-tree.
<i>Hura,</i>	—	Sand-box-tree.
<i>Jatropha,</i>	—	Cassava, manihot.
<i>Mercurialis,</i>	—	Mercury.
<i>Phyllanthus,</i>	—	Sea-side laurel.
<i>Plukenetia.</i>		
<i>Ricinus,</i>	—	Palma-Christi.
<i>Solandra.</i>		
<i>Sterculia.</i>		
<i>Tragia.</i>		
<i>Thryallis.</i>		

This family not being completely natural does not fall to be particularly described in this place. The character expressed in the title is indeed a striking one, and though the

the plants which possess it are not connected together by such numerous relations as to form a true natural assemblage, yet are they by that circumstance distinguished from all other plants, with as great, perhaps greater facility than by any artificial character yet known. It is, however, to be observed, that all the genera of this order have not the striking character just mentioned.

From the euphorbias, and several other genera of this order, flows by incision a corrosive liquor, which is white like milk.

The fruit of the manchineel tree is one of the most powerful caustics, and, if taken internally, never fails to prove mortal, if large quantities of oil are not immediately swallowed, to excite vomiting and sheath the viscera, before the caustic juice has operated. The tree bears a great resemblance to the pear-tree. The bark is somewhat thicker, and filled with a viscous corrosive milk. The wood under the alburnum is greyish, and beautifully marked with eyes of different tints or colours. The caustic and poisonous quality is not peculiar to the fruit, being to be found also in the leaves, in the wood, in the milk of the bark, and even in its shade, by sleeping under it.—The tree, which is commonly large, grows in the West-Indies, on the bank of rivers, or on the sea-shore, being rarely found at a distance from water. When it rains, one must be cautious of going under the tree for shelter, as the rain falling from its leaves on the hands, and other parts of the body, excites blisters on the flesh, as if boiling oil had fallen upon it, together with a very painful itching, which continues for a long time. If it falls into the eyes, it will endanger the eye-sight; or if by chance one should rub them with his hand moistened with this water, a considerable swelling is occasioned, which from being red, becomes livid and full of pus.—The wood is no less dangerous to work, unless perfectly dry, and even its dust or sawings are poisonous. Before it is touched, the workmen amass dry wood around its feet, set fire to it, and keep at a distance for fear of any bad consequences from the smoke. When they think the fire has totally consumed

its humidity, they apply the hatchet, taking care to have their face and arms covered with a towel or napkin, lest the dust flying out of it, or the milky humidity which may have remained unevaporated, should assail their face, mouth, eyes, or hands. The sawyers use the same precautions, as well as the turners who work it into tables, cabinets, and all sorts of household furniture, which are greatly esteemed for the uncommon beauty of the wood.—The Indians use the milk of the manchineel-tree to poison their arrows. For this purpose they make a cleft in the bark and insert the end of their arrows, which imbibes the liquor flowing out of the wound, that is white as milk, but thicker and more gluey. The arrows so envenomed are suffered to dry; and where they make a wound, poison at the same time.—Those who sleep under the manchineel-tree find themselves, on awaking, prodigiously swelled, with a very violent negrim and a dangerous fever. By force of citron-juice and cordials, the venom is often, but with difficulty, extirpated.

A species of euphorbia termed *esula*, if applied to any part of the body, produces a violent inflammation, which is soon succeeded by a considerable swelling, that degenerates into a gangrene and proves mortal.

Sterculia (*stercus*, dung) derives its name from the foetid smell of the wood, which is said to resemble that of human excrements, whence the name of dirt-wood, by which it is known in the hot countries, where it is native.

The root of cassada, cassava, or manihot being divested of its poisonous juices, serves for bread to most of the inhabitants of the West India islands, whether black, white or red; that is, Negroes, Europeans, or Natives. The shrub, sometimes called manioc, rises seven or eight feet high, with a thin bark, that is grey, red, or violet, according to the different colours of the wood which it covers. The trunk and branches are filled with small prominences exhibiting the vestigia of the fallen leaves: for as the tree increases in height, the leaves relinquish the bottom of the branches, and are only to be found near the top. The wood is soft and brittle. The plant is better propagated by layers than from seed;

feed ; at least, little of the root proper for eating is to be obtained by the latter method. The principal root produces suckers, in number from four to seven, and which differ in length and thickness, according to the age of the tree and goodness of the soil. The bark of the roots is like that of the trunk, grey, when the wood is grey ; red, when the wood is red ; white, when it is white ; but the inside or heart is always white, and of the consistence of turnip. The roots of white manioc are ripe in eight months ; those of the other kinds require fourteen or eighteen months to attain their full size and maturity. When ripe they are plucked out of the earth by the tearing up of the whole tree, which never fails to be accompanied by the root ; and if, in that operation, any of the off-sets should be separated from the main root, which is easily observed, they take them up with a hoe. It requires no great force to pluck up these shrubs ; for, besides that the soil is of a soft nature, the roots do not penetrate very deeply into it. When plucked up, the Negroes destined for this work grate or rasp the bark with a blunt knife, as is done to turnips, and throw the roots into a tub full of water ; they are then reduced to a powder or meal resembling the coarse sawings of wood. This is effected by rubbing the root very forcibly against a copper file or grater, about fifteen or eighteen inches long, and ten or twelve broad, that is fastened by small nails upon a plank of timber, three feet and a half long, and one broad. The Negroe who files, puts one end of the plank into a wooden trough or tub, and holds the other against his stomach. At his side is a basket, containing roots that are rasped, washed, and fit for being filed ; one of these he takes in each hand, and passes it violently upon the file or grater till it is reduced to a rough powder.—All the roots being grated in this manner, they take the powder and put it into a press, with a view to squeeze out the juice, which is regarded as a very strong poison, not only for men, but for beasts also who drink of it, or chance to eat of these roots before the juice is expressed. It is remarkable, that animals which die in consequence of having swallowed any quantity of this substance, have their breasts prodigiously

swelled, without any visible alteration on the noble parts. Some have hence argued that the juice in question is not essentially a poison, but that possessing a superfluity of nourishment, it proves an over-match to the digestive faculties, and thus proves mortal.—Besides this superabundance of nourishment, says Father Labat, a part of its malignity consists in its coldness, which stops the circulation, benumbs the animal spirits, and at length causes death. Hence the best antidote against this poison is heat and violent motion. The patient, after swallowing large quantities of oil, to excite a nausea and vomiting, is made to run as quick as he can, and drink plentifully of the strongest spirits; in fine, every method is used to excite violent heat, to rouse the spirits, and put the blood in motion.

Animals which have accustomed themselves insensibly to the juice of manioc, feel no inconvenience from the root of it, but rather the contrary. It is in this manner that the Turks, by a gradual and constant use, have rendered opium a harmless and even exhilarating medicine.

The juice of manioc loses its malignity when heated. The natives of the West-Indies, who use it in all their sauces, feel no sort of inconvenience from it, because they never use it till after being boiled. Of the same juice they make starch, by drying it in the sun, where it becomes as white as snow, and is frequently made into cakes, which are as delicate as if made with the finest wheat-flour.

When the manioc is sufficiently pressed, they either make it into bread, called cassada, or into flour for preserving. For the first-mentioned purpose, they have a plate of iron, two feet broad, and half an inch thick; this they place upon a tripod, or on stones, and kindle a fire below it. When sufficiently heated, so as not to admit of the touch, they lay on the whole surface about the thickness of three fingers of manioc, which has been previously pressed and sifted. The heap falls down in proportion as it roasts; and the parts join and incorporate. This compression and incorporation is aided by the person who roasts slightly passing a piece of wood over the plate. When the side of the cake next the
plate

plate is sufficiently done, that is, adheres, and the colour, formerly very white, becomes red, it is turned, and the other side allowed to roast till the same symptoms appear. When roasted, it is laid in the sun for two or three hours, with a view to dissipate any poisonous humidity, which may still lurk in the root under this new form.

The inside of cassada is as white as snow, the sides of a pale gold colour. The substance, which is very nourishing, and of easy digestion, may be preserved seven or eight months, or more, provided it is kept dry, and sometimes exposed to the sun. When dipped in water, or put in soup, cassada swells up to a great height, which seems to prove its great abundance in substance.

The other mode of preparation, however, is most common, as being more convenient for preserving, distributing to the Negroes, and transporting from place to place. The manioc, in this case, is put into a pan or stove that is but slightly heated, where it is continually turned, like coffee-beans, with a small wooden instrument contrived for that purpose. This motion prevents it from sticking to the pan; so that, when dried and roasted, it has the appearance of thick red grains of salt. This mode of preparation is much more expeditious than the former. When dried, it is put into granaries, where it may be preserved whole years, if kept dry, or put into a stove every six months.

This substance may be eaten quite dry, as crumbled bread, or as the Turks eat roasted rice. When moistened, it swells prodigiously.

This latter method of preparing manioc is never practised by the natives, who use only cassada, which they prepare once every day or oftener, as occasion requires; for they eat it quite hot, as being then more delicate and agreeable to the taste. Before their intercourse with the Europeans had procured them iron plates, they made their cassada upon large flat stones, whose thickness they adjusted to that purpose. In default of copper files or graters, they made use

of

of a plank of wood, in which were fixed very small sharp bits of pebbles.

One species of manioc is said to be exempt from the poisonous quality possessed by the juice of the others. It is called camanioc, that is, chief of manioc; in fact, its wood, leaves, and roots are larger and thicker than the others, and it is eaten without danger, or any precaution: but as it requires a longer time to attain maturity, and the roots yield much less meal, because lighter and more spongy, it is generally neglected.

The small bits of manioc, which have escaped the grater, and the clods which have not passed the sieve, are not useless. They are dried in the stove, after the flour is roasted, and then pounded in a mortar to a fine white powder, with which they make soup. It is likewise used for making a kind of thick coarse cassada, which is roasted till almost burnt; of this, fermented with melasses and West-India potatoes, they prepare a much esteemed beverage, called ouycou. This liquor, the favourite drink of the natives, is sometimes made extremely strong, especially on any great occasion, as a feast; with this they get intoxicated, and, remembering their old quarrels, wound and murder one another. Such of the inhabitants and workmen as have not wine, drink ouycou. It is of a red colour, strong, nourishing, refreshing, and easily inebriates the inhabitants, who soon accustom themselves to it as easily as beer.

The leaves of manioc are used in both Indies as those of spinach are with us.

Box-wood being extremely hard is used for several purposes, and may properly enough be substituted in default of ebony, the yellow alburnum of which it perfectly resembles. Employed in medicine, box-wood is sudorific.

The Negroes of Senegal use from three to five entire seeds of *iatropha curcas* for purging the intestines; used in greater quantity, these seeds would prove mortal. It appears too that the purgative virtue resides only in the radicle or *punctum vite* of the seeds; for the Negroes eat with equal impunity

impunity and avidity large quantities of these seeds, after the radicle has been extracted.

Papaw, or popo-tree, the *carica papaya* of Linnæus, is male and female upon different roots: the flowers of the former being white, of the latter yellowish. The tender buds of these last are preserved into sweet-meats; and the long mango popo, which is said to be little inferior to an East-India mango, into pickles. When nearly ripe the fruits are likewise boiled and eaten with any kind of flesh-meat, care being taken previously to cleanse them of the milky corrosive juice contained in them, which is of so penetrating a nature, says Hughes *, that, if the unripe fruit, when unpeeled, is boiled with the toughest old salt meat, it will soon make it soft and tender; and, if hogs are for any considerable time fed with the raw fruit, it wears off all the mucous slimy matter which covers the inside of the guts, and would, in time, if not prevented by a change of food, entirely lacerate them. This juice, continues the same author, is sometimes made use of to cure ring-worms and such cutaneous eruptions.

The kernels of sand-box tree are said to be purgative, and sometimes emetic. The use to which the capsule, generally cut into fifteen or sixteen divisions, is applied, suggested the name given to this curious and beautiful exotic.

The leaves and tender buds of physic-nut tree, a species of *croton*, emit a milky juice, which is said to be applied to green wounds with success. The nut, when ripe, yields a considerable quantity of oil, a spoonful of which swallowed when fresh is of a purgative quality, and deemed proper for abating swellings in dropfical disorders.

The bark of *cascarilla*, another species of the same genus, is used successfully by the natives of Senegal in tertian fevers that are accompanied with a diarrhœa.

From the berries of the ricinus, or *palma-christi*, is extracted an oil which the natives of the West Indies use in

* Natural History of Barbadoes.

their soups. This oil is generally known in those countries by the name of castor oil.

The Negroes of Senegal use externally with success the leaves of *palma christi* in megrims and inflammations of the eyes.

The wind blowing into the cavities of the capsules of *hernandia sonora* makes a very sonorous whistling noise; whence the name of jack-in-a-box, by which this plant is generally known.

Croton tinctorium yields by expression a greenish juice, which, by means of the volatile alkali of urine, dyes stuffs of a blue colour.

TRIHILATÆ, (*tres*, three, and *hilum*, an external mark on the seed); the name of the twenty-third class in Linnæus's Fragments of a Natural Method, consisting of plants with three seeds, which are marked distinctly with an external cicatrix or scar where they were fastened within the *pericarpium*.

List of the Genera contained in this Order.

Linnæan Genera.		English Names.
α	<i>Melia</i> , — —	Bead-tree.
	<i>Trichilia</i> .	
β	<i>Acer</i> , — —	Maple.
	<i>Æsculus</i> , — —	Horse-chestnut.
	<i>Banisteria</i> .	
	<i>Malpighia</i> , — —	Barbadoes-cherry,
	<i>Triopteris</i> .	
γ	<i>Cardiospermum</i> , — —	Heart-feed, or heart-pea,
	<i>Paullinia</i> .	
	<i>Sapindus</i> , — —	Soap-berry.
	<i>Staphylæa</i> , — —	Bladder-nut.
	<i>Tropæolum</i> , — —	Indian cress.

TRIPETALOIDEÆ, (*tres*, three; and *petalum*, a petal)
the

T R U

the name of the fifth class in Linnæus's Fragments of a Natural Method, consisting of plants with three petals.

List of the Genera contained in this Order.

Linnæan Genera.	English Names.
<i>Alisma</i> , — —	Water-plantain.
<i>Aphyllanthes</i> .	
<i>Butomus</i> , — —	Flowering-rush, or water-gladiolus.
<i>Calamus</i> .	
<i>Flagellaria</i> .	
<i>Juncus</i> , — —	Rush.
<i>Sagittaria</i> , — —	Arrow-head.
<i>Scheuchzeria</i> , — —	Lesser flowering-rush.
<i>Triglochin</i> , — —	Arrow-headed grass.

These plants have no very striking characters, and are nearly allied to the grasses. All the genera have not the circumstance expressed in the title.

TRUNCUS, the trunk; that part of the herb which arises immediately from the root, and is terminated by the fructification; the leaves, buds, and auxiliary parts of the herb, not entering into its description.

The different species of trunks enumerated by Linnæus are as follows :

CAULIS.

CULMUS.

SCAPUS.

FRONS.

Each of these terms is particularly explained in its proper place.

To this article, as the most suitable for that purpose, I formerly referred the reader for some general remarks on the mutual relations which subsist betwixt roots and stems.

These principal parts of the plant are unfolded, branch, and subdivide almost in the same manner : the extent and force

force of the one being always too in proportion to the same qualities in the other. A shrub which puts out small branches; has universally slender roots. The same tree planted in an espalier, where its growth is cramped, or it is pruned very close, produces roots that are less numerous, less strong, and less extensive, than if cultivated as a standard in full air. Hence the impracticability of extending the roots of a tree by lopping its branches. A fruit-tree, by such an operation, will produce more fruit, because most of the nourishment which went to these lopped branches, is now concentrated in the fruit; but its growth will be retarded, and its life rendered shorter.

Further, stems as well as roots are lengthened by their extremities, which cease to grow upon being cut. Both, in consequence, form new productions: the stems put forth lateral branches; the roots, lateral roots; whence it follows, that to cut the extremities of the stem and branches, is the proper way to form the heads of trees; and, in like manner, to cut the extremity of long perpendicular roots, is an excellent method to form beautiful and vigorous trees; for the perpendicular root being cut, the lateral ramifications, or side-roots, multiply; and these being placed nearer the surface of the earth, find a greater supply of nourishing juices in their progress.

Again, the stem is provided with several buds of branches, and the root with several suckers, or buds of roots. They may likewise be compared in their organization or internal structure, which, in both, is nearly the same, unless that the epidermis or scarf-skin of the root is thicker, and the colours, internally, stronger and more lively.

In short, except in their direction, which is universally opposite, stems and roots seem to bear a remarkable analogy to one another, so that, as Linnæus observes, stems may be considered as roots above ground.

TUBA, a trumpet. Vaillant's name for the *stylus* of Boerhaave and Linnæus; the *pistillum* of Tournefort. *Vide* STYLUS.

TUBULOSUS *flor*, a species of compound flower so termed

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termed by Linnæus, all the florets or partial flowers of which are funnel-shaped, and nearly equal.

Of this kind are thistle, burdock, artichoke, hemp-agrimony, tanfy, cud-weed, and bidens.

The flowers in question correspond to the *flosculosi* of Tournefort and Pontedera, the *compositi regulares* of Rivinus, the *compositi uniformes* of Christian Knaut, and the *capitatae* of Boerhaave and Ray.

TUBUS, the tube, or lower hollow part of a flower with one petal; opposed to *unguis*, the claw of a polypetalous flower.

V.

VAGÆ. Under this name Linnæus arranges a number of genera, which remain vague and undetermined; as, for want of uniform relations, they cannot constitute of themselves a true natural assemblage, nor consequently be referred to any of his Natural Orders.

In the Fragments of his Natural Method, they form an Appendix to the Scheme, by the name of *Dubii etiamnum Ordinis*.

VALVULA, a little valve, or opening; the external divisions of a dry seed-vessel, as a capsule, or pod, which split when the seeds are ripe for the purpose of dissemination.

The openings in question are either two in number, as in celandine, cabbage, and the pea-bloom flowers; three, as in violet, and Greek valerian; four, as in tree-prunrose, and French-willow herb: or five, as in flax, lime-tree, and Syrian mallow.

VARIETAS, a variety; a plant changed by some accidental cause, which being removed, the variety or mutation disappears, and the species is restored. As many plants of different form and appearance as are produced from seed of the same species, are to be regarded as genuine varieties, and

in all cases to be distinguished with great accuracy from the species.

In the form and disposition of the parts of each individual of the same species, there exists, in general, a constant uniformity. Different causes, however, as culture, climate, exposure, age, diseases, luxuriance or poverty of nourishment, contusions, and other circumstances, produce monstrous appearances and accidental varieties in the parts of plants.

In treating of luxuriance in flowers, we observed that a superabundance of nourishment gives rise to the numerous tribe of double and prolific flowers. The same cause gives to all the parts of the plant a thickness and extent, by no means natural to them. Hence, likewise, the prodigious multiplication of the leaves of some plants, which increase to such a degree, as frequently to injure the flower and fruit.

The leaves of young trees and of new shoots are much larger, and less cut and ramified than those of a grown tree of the same species. In holly, the leaves lose their prickles when the tree waxes old.

The lower leaves of aquatic plants, as crow-foot and water-drop-wort, are frequently finely cut like hairs, whilst those above are of a different form. Plants of the same species that grow in another soil, have no diversity in the form of their upper and under leaves. Again, in mountainous plants, the lower leaves are generally more entire; the upper ones more divided. Burnet saxifrage, anise and coriander, furnish examples.

The seeds or grains of many grasses, particularly of rye, are sometimes prolonged into a horny appearance of a fungous substance, that is pretty hard, and, as it were, cartilaginous. Some of these monstrous productions are more than two inches long. Rye diseased in this manner is frequently attended with fatal consequences to such as eat of the bread prepared from it. The same appearance has been observed in *gramen aquaticum fluitans*, and *carex*. This
disease,

disease, termed by Linnæus *clavus*, is common in moist years and rainy seasons, and seems to be principally owing to a defect of perspiration.

The flowers and seeds of many of the esculent grasses, and of some other plants, are frequently reduced into a black powder. This appearance has been particularly observed in wheat, rye, barley, oats, persicaria, marsh scorzonera, goat's-beard, soap-wort, and some of the lychnis, pink, and chick-weed tribe. In the greater number, the disease, when it attacks the flower, begins by the receptacle under the form of small black points, which insensibly reach the other parts of the flower, as the flower-cup, petals, and stamina, without attacking the pistil, or female organ, which, however, commonly proves abortive.

The disease termed *ustilago*, or burning, differs from that just mentioned, in that it is contagious and hereditary; the seeds being the only parts that are affected by it. It has been discovered in the same species of grasses as the former, but more abundantly on Indian millet. M. Aymen, a French academician, attributes both these diseases to an internal fault in the sap.

The upper surface of the leaves of some plants, particularly of hop, melon, dead-nettle, hedge-nettle, maple, and gromwell, is subject to be covered with a white appearance, which makes the leaves seem thicker, more weighty, and more opaque. Plants which are attacked by this disease, termed by botanists *erysiphe*, rarely produce any fruit; or, if they do, it is badly formed, and has a crude disagreeable taste.

On the under surface of the leaves of ladies mantle, and a species of euphorbia with cypress leaves, is occasionally dispersed a yellowish dust, which, from its resemblance to rusty iron, has occasioned the name of *rubigo*, or rust, to be given to this particular disease, which, like *clavus*, and some others, appears to proceed from a defect of perspiration.

White spots are frequently observed on some leaves, which thence appear empty, and, as it were, transparent. It is occasioned by the influence of a burning sun acting

upon them when very much moistened, either in consequence of continued rain, or a strong dew. When all the leaves are attacked with this disease, which has obtained the name of *candor*, that is, the whites, the plant commonly perishes a few days after.

Certain plants of warm climates are subject to lose their petals, when cultivated in cold countries, and that, even when the fruit arrives at maturity. For particulars on this subject, the reader is referred to the article *MUTILUS flos*.

Plants which grow in the shade, or in places that are deprived of a proper current of air, are apt to become meagre, and, without taking the consistence which is suitable, to perish before they have produced any fruit. Experiments demonstrate, that the feebleness of such plants proceeds less from a defect of heat than from a privation of light.

Other causes alter the colour of leaves, and occasionally produce the beautifully variegated leaves so much in request among gardeners. Some leaves are subject to assume a deep red; this is particularly the case with herb Robert, a species of crane's-bill.

The branches of ash and willow are frequently flattened in several irregular ways. This is supposed to be in consequence of two buds being naturally grafted in each other, before the unfolding of the branch. Two leaves, or two fruits engrafted in this manner, produce other monstrous appearances. By means of artificial grafting, we may, in like manner, vary the form of leaves, stems, flowers and fruit.

Lastly, certain insects depositing their eggs under the bark of the leaves and stems of several plants, occasion an extravasation of the sap, and hence give birth to certain singular productions, which in different bodies resemble either nuts, mushrooms, or sponges, and are either round or long, hard or soft, covered with leaves, or guarded with bristly threads.

Such are the galls of oak which enter into the composition of ink; those of lime, eistus, ground-ivy, a species of hawk-weed, the aspen-tree, and several species of willow. Those of a species of sage called *salvia baccifera*, are sold in

the markets of the Levant by the name of sage-apples. Tournefort relates that they are round, nine or ten lines in diameter, of the colour of ashes, cottony, with a white pulp that is somewhat transparent, sweet, and of a very agreeable taste. Those of the scarlet oak are two lines in diameter. The substance is very red, and being dried, is the kermes, or scarlet-pastel, so well known by the dyers.

Of the same nature with the galls just mentioned are those strange bodies covered with green, red, or yellow fibres, termed *bedeguar*, which a fly of the same kind produces upon the wild-rose. Such are likewise the small bladders on the surface of elm-leaves, which are filled with gnats, and with an astringent balmy liquor that is an excellent vulnerary.

Such are the principal accidents to which the parts of plants are subject, and which give rise to the numerous tribe of varieties in the vegetable kingdom.

VEPRECULÆ, (diminutive from *vepres*, a briar, or bramble;) the name of the thirty-first order in Linnæus's Fragments of a Natural Method, consisting of the following genera, which do not constitute a true natural assemblage.

Linnæan Genera.

English Names.

<i>Dais.</i>			
<i>Daphne,</i>	—	—	Mezereon, or spurge-laurel.
<i>Dirca,</i>	—	—	Leather-wood.
<i>Gnidia.</i>			
<i>Lachnæa.</i>			
<i>Passerina,</i>	—	—	Sparrow-wort.
<i>Quisqualis.</i>			
<i>Stellera,</i>	—	—	German groundsel, or Tragus's sparrow-wort.
<i>Thesium.</i>			

VERNATIO (a renewing, or growing again, from *ver*, the spring;—foliation or leafing). By this general term, instead of *foliatio*, which he had employed in his earlier works, Linnæus has expressed in the later editions the curi-

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ous manner in which the leaves are folded or wrapped up in their buds.—In this respect, leaves are

Conduplicata, doubled together, as in oak, ash, beech, rose, bramble, and most of the plants of the class *Diadelphia* of Linnæus.

Convoluta, rolled together like a scroll, as in asar, golden-rod, comfrey, and most of the grasses.

Equitantia, riding on one another, as in iris, acorus, *carex*, *poa*, and some other grasses.

Involuta, rolled spirally inwards on both sides, as in pear, apple, honey-suckle, violet, hop, and nettle.

Revoluta, rolled backwards on both sides, as in fox-glove, dock, pellitory, groundsel, and colt's foot.

Obvoluta, rolled up against one another, as in valerian, teasel, scabious, pink and sage.

Imbricata, laid over one another like tiles, as in privet, St. John's wort, and Greek valerian.

Circinalia, rolled spirally downwards, as in the ferns, and some palms.

Plicata, plaited, as in mallow, vine, passion-flower, and alder-tree, or

Reclinata, folded back towards the footstalk, as in anemone and monk's hood.

By actually dissecting the buds of these plants, which are familiar to most, and likewise easily to be found, for which reason I have preferred them as examples, the learner in botany will acquire a far more accurate knowledge of the full force and meaning of the above-mentioned terms of foliation, than by any definition or description, however exact and elaborate.

VERTICILLATÆ, (from *verticillus*; *vide infra*) the name of a class in Ray's and Boerhaave's Methods, consisting of herbaceous vegetables having four naked seeds, and the flowers placed in whorls round the stalk. The term is synonymous to the *labiati*, or lipped-flowers of Tournefort, and is exemplified in mint, thyme, and savory.

VERTICILLATÆ is also the name of the forty-second order

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order in Linnæus's Fragments of a Natural Method, consisting of plants which answer the above description.

List of the Genera contained in this Natural Order.

Linnæan Genera.

English Names.

<i>Ajuga,</i>	—	—	Bugle.
<i>Amethystea.</i>			
<i>Ballota,</i>	—	—	Black hore-bound.
<i>Betonica,</i>	—	—	Betony.
<i>Cleonia.</i>			
<i>Clinopodium,</i>	—	—	Field-basil.
<i>Cunila.</i>			
<i>Dracocephalum,</i>	—	—	Dragon's head.
<i>Galeopsis,</i>	—	—	Hedge-nettle.
<i>Glechoma,</i>	—	—	Ground-ivy.
<i>Herminum,</i>	—	—	Pyrenæan clary.
<i>Hyssopus,</i>	—	—	Hyssop.
<i>Lamium,</i>	—	—	Dead nettle.
<i>Lavandula,</i>	—	—	Lavender.
<i>Leonurus,</i>	—	—	Lion's-tail.
<i>Lycopus,</i>	—	—	Water hore-hound.
<i>Marrubium,</i>	—	—	Hore-hound.
<i>Melissa,</i>	—	—	Balm.
<i>Melittis,</i>	—	—	Bastard balm.
<i>Mentha,</i>	—	—	Mint.
<i>Moluccella,</i>	—	—	Molucca balm.
<i>Monarda.</i>			
<i>Nepeta,</i>	—	—	Cat-mint, or nep.
<i>Ocimum,</i>	—	—	Basil.
<i>Origanum,</i>	—	—	Marjoram.
<i>Orvala.</i>			
<i>Phlomis,</i>	—	—	Sage-tree, or Jerusalem-sage.
<i>Prasium,</i>	—	—	Shrubby hedge-nettle.
<i>Prunella,</i>	—	—	Self-heal.
<i>Rosmarinus,</i>	—	—	Rosemary.
<i>Salvia,</i>	—	—	Sage.

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Linnæan Genera.		English Names.
<i>Satureia</i> ,	—	Savory.
<i>Scutellaria</i> ,	—	Skull-cap.
<i>Sideritis</i> ,	—	Iron-wort.
<i>Stachys</i> ,	—	Base hore-hound.
<i>Teucrium</i> ,	—	Germander.
<i>Thymra</i> ,	—	Mountain-hyssop.
<i>Thymus</i> ,	—	Thyme.
<i>Trichostema</i> .		
<i>Ziziphora</i> ,	—	Syrian field basil.

Habit and Structure of the Plants of this Order.

This order, termed by Tournefort *labiati*, or lipped-flowers, from the unequal and irregular divisions of the petal, which commonly resemble the two lips of an animal, contains annual and perennial herbs, and shrubby plants, some of which retain their green leaves during the winter.

The **ROOTS** are branched and fibrous.

The **STEMS** are round when old, square, when young; as are likewise the young branches which stand opposite.

The **LEAVES** are opposite, and in the greater number covered with transparent points. Those which are placed next the flower generally differ from the stem-leaves.

In the greater number of plants of this order, the leaves are supported upon a long cylindrical foot-stalk that is furrowed above. Some, however, as dead-nettle and bugle, have the leaves attached immediately to the branches without any foot-stalk.

The **FLOWERS** are universally hermaphrodite, except in a species of thyme mentioned by Adanson, which appears to have male or barren flowers on one root, and female or fertile flowers on another.

They are disposed round the stem, as the title imports, in whorls, or small heads, with short foot-stalks.

The **FLOWER-CUP** is of one piece, that is generally cut into five unequal divisions, whose disposition sometimes represents two lips, the uppermost of which has commonly a
less

less number of divisions. It accompanies the seeds, which it nourishes in its bosom, to their maturity.

The PETAL is of the gaping or lip kind, and, in the different genera, is more or less irregular or unequal, either in its tube, or in the divisions of the upper part, the number of which varies from two to five. These divisions frequently form two lips, of which the uppermost, termed the crest and the helmet, is sometimes entire, sometimes more or less deeply cut into two; the lowermost, termed the beard, generally into three. In germander and bugle the upper lip is very short, and over-topped by the stamina.

The STAMINA are two, or four in number. In the greater part, there are four stamina of unequal length, two of them being longer than the others; a character which determines such plants to the class *didynamia* of the Sexual Method. As to sage, rosemary, and the other genera with two stamina, they are approximated to the other plants of this order, not only by their general habit, and the figure of the flower, but even in some of the genera by the number of stamina, which, although only two, yet are accompanied by filaments which resemble stamina without the *anthers*. This appearance is particularly conspicuous in sage and a species of monarda.

The four unequal stamina are frequently dissimilar, and approach by pairs; they are inclined towards the back of the petal, and parallel; the two innermost being shortest, and attached somewhat lower than the two others to the tube of the flower.

The SEED-BUD, which consists of four distinct *ovaria*, is placed upon the seat of the flower, and elevates from their centre a common style, that is slender, bent in the same manner as the filaments which it somewhat exceeds in length, and terminated by a double stigma, the divisions of which are unequal, and turned backwards.

The SEED-VESSEL in this order is wanting.

The SEEDS are four in number, and lodged in the bottom of the flower-cup as in a matrix, or seed-vessel. Each seed has two covers; the one external, of a cartilaginous,

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or leathery substance ; the other internal, membranaceous, of a very fine texture, and placed immediately above the radicle or embryo-plant.

The plants of this order are fragrant, warm, penetrating, and accounted cordial, and cephalic. Their principal virtue resides in the leaves.

The chief aromatics are savory, thyme, marjoram, penny-royal, mint, balm, lavender, rosemary, sage, clary.

VERTICILLUS, (properly, a little whorl, hinge, axis, or spindle); a mode of flowering, in which the flowers are produced in rings at each joint of the stem, with very short foot-stalks. The term is exemplified in mint, hore-hound, and the other plants of the natural order described above.

VEXILLUM, a standard ; the upper petal of a pea-bloom, or butterfly-shaped-flower, which is generally larger than any of the others. *Vide* **COROLLA** and **DIAPHRAGMA**.

VIGILIE PLANTARUM, the vigils of plants.

Under this term, botanists comprehend the precise time of the day in which the flowers of different plants open, expand, and shut,

As all plants do not flower in the same season, or month ; in like manner, those which flower the same day, in the same place, do not open and shut precisely at the same hour. Some open in the morning, as the lipped-flowers, and compound flowers with flat spreading petals ; others at noon, as the mallows ; and a third set in the evening, or after sun-set, as some geraniums, and opuntias. The hour of shutting is equally determined. Of those which open in the morning, some shut soon after, while others remain expanded till night.

The hours of opening, like the time of flowering, seem to vary, according to the species of the plant, the temperature of the climate, and that of the season. Flowers, whose extreme delicacy would be hurt by the strong impressions of an ardent sun, do not open till night ; those which require a moderate degree of heat to elevate their juices, in other
words,

words, whose juices rise in the morning or evening, expand then; whilst those which need a more lively heat for the same purpose, expand at noon, when the sun is in his meridian strength. Hence it is, that the heat of the air being greater betwixt the tropics than elsewhere, plants which are transported from those climates into the cold or temperate climates of Europe, expand their flowers much later than in their native soil. Thus, a flower which opens in summer at six o'clock in the morning at Senegal, will not open at the same season in France and England till eight or nine, nor in Sweden till ten; that which opens at eight at Senegal, expands at ten in France and England, and at noon in Sweden; a flower which opens at ten at Senegal, does not open in France and England till noon; and, in Sweden the plant does not flower, or, at least, loses its petals, and frequently bears no fruit; lastly, a plant which opens its flowers in Senegal at noon, or at one or two hours after noon, bears neither flowers nor fruit in France, England, and Sweden. The same thing happens to most plants of temperate countries, when removed to Senegal, or other sultry climes.

Linnæus distinguishes by the general name of *solar* (*flores solares*) all those flowers which observe a determinate time in opening and shutting. These flowers are again divided, from certain circumstances, into three species, or kinds:

Equinoctial flowers (*flores æquinoctiales*) are such as open and shut at all seasons at a certain fixed or determinate hour.

Tropical flowers (*flores tropici*) are such whose hour of opening is not fixed at all seasons, but accelerated or retarded according as the length of the day is increased or diminished.

Meteorous flowers (*flores meteorici*) are such whose hour of expansion depends upon the dry or humid state of the air, and the greater or less pressure of the atmosphere. Of this kind is the Siberian sow-thistle, which shuts at night, if the ensuing day is to be clear and serene, and opens if it is to be cloudy and rainy. In like manner the African marigold, which

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which in dry serene weather, opens at six or seven in the morning, and shuts at four o'clock in the afternoon, is a sure indication that rain will fall during the course of the day, when it continues shut after seven.

VOLVA, (properly, that wherein a thing is wrapped, *a volvo*, to roll up or infold). The membranaceous cover, (termed by Linnæus the calyx) which enfolds many mushrooms before their expansion, and bursts in order to make a free passage for the plant.

UMBELLA, (diminutive from *umbra*, a shade)—an umbel, a species of receptacle, or rather a mode of flowering, in which a number of slender flower-stalks proceed from the same centre, and rise to an equal height, so as to form an even and generally round surface at top. The term differs from *corymbus*, another mode of flowering, in that there is a common part, the point, from which issue all the foot-stalks, and in that the foot-stalks are of an equal length; whereas in a *corymbus*, the foot-stalks proceed from different points, and though they altogether form an even surface at top, as in the umbel, yet is each lower foot-stalk of greater length than that immediately above it.

When none of the foot-stalks of an umbel are subdivided, as in ginseng, it is termed simple; when, on the other hand, each flower-stalk is subdivided at its extremity into a number of smaller foot-stalks for supporting the flowers, in other words, when each foot-stalk bears at top an umbel, the whole head or aggregate is termed a compound umbel, to distinguish it from the simple, in which there are no subdivisions, and, likewise, an universal umbel to distinguish it from the partial or particular umbel of each foot-stalk. An universal umbel is constituted from an aggregate of partial umbels. Compound umbels are more common than simple. Instances will be adduced below.

UMBELLATÆ (*ab UMBELLA, vide supra*) the name of a class in Ray's and Tournefort's methods, consisting of plants whose flowers grow in umbels, with five petals that are often unequal, and two naked seeds that are joined at top, and separated below.

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The same plants constitute the forty-eighth order of Linnæus's Fragments of a Natural method. Their names and general description follow.

List of the Genera contained in this Natural Order.

Linnæan Genera.		English Names.
<i>Ægopodium,</i>	—	Herb-gerard, gout-wort, or wild angelica.
<i>Aethusa,</i>	—	Lesser hemlock, or fools parsley.
<i>Anmi,</i>	—	Bishop's-weed.
<i>Anethum,</i>	—	Dill, fennel.
<i>Angelica.</i>		
<i>Apium,</i>	—	Parsley.
<i>Arctopus.</i>		
<i>Artemisia.</i>		
<i>Astrantia,</i>	—	Black master-wort.
<i>Athamanta,</i>	—	Spignel.
<i>Bubon,</i>	—	Macedonian parsley.
<i>Bunium,</i>	—	Pig-nut, or earth-nut.
<i>Bupleurum,</i>	—	Hare's ear.
<i>Cachrys.</i>		
<i>Carum,</i>	—	Carui, or caraway.
<i>Caucalis,</i>	—	Bastard parsley.
<i>Chærophyllyum,</i>	—	Chervil.
<i>Cicuta,</i>	—	Water-hemlock.
<i>Conium,</i>	—	Hemlock.
<i>Coriandrum,</i>	—	Coriander.
<i>Crithmum,</i>	—	Samphire.
<i>Cuminum,</i>	—	Cumin.
<i>Daucus,</i>	—	Carrot.
<i>Echinophora,</i>	—	Prickly-parsnep.
<i>Eryngium,</i>	—	Eryngo.
<i>Ferula,</i>	—	Fennel-giant.
<i>Hasselquistia.</i>		
<i>Heracleum,</i>	—	Cow-parsnep.
<i>Hydrocotyle,</i>	—	Water navel-wort.
		<i>Imperatoria,</i>

U M B

Linnæan Genera.		English Names	
<i>Imperatoria</i> ,	—	—	Master-wort.
<i>Laserpitium</i> ,	—	—	Lafer-wort.
<i>Ligusticum</i> ,	—	—	Lovage.
<i>Oenanthe</i> ,	—	—	Water drop-wort.
<i>Pastinaca</i> ,	—	—	Parfnep.
<i>Peucedanum</i> ,	—	—	Hog's-fennel, or sulphur-wort.
<i>Phellandrium</i> .			
<i>Pimpinella</i> ,	—	—	Burnet-saxifrage.
<i>Sanicula</i> ,	—	—	Sanicle.
<i>Scandix</i> ,	—	—	Shepherd's-needle, or Venus's comb.
<i>Selinum</i> ,	—	—	Milk-parsley.
<i>Seseli</i> ,	—	—	Heart-wort of Marseilles.
<i>Sium</i> ,	—	—	Water-parsnep.
<i>Sison</i> ,	—	—	Bastard-stone-parsley.
<i>Smyrnium</i> ,	—	—	Alexanders.
<i>Thapsia</i> ,	—	—	Deadly-carrot, or scorching-fennel.
<i>Tordylium</i> ,	—	—	Hart-wort of Crete.

Habit and Structure of the Plants of this Order.

These plants are herbaceous, and chiefly perennial.

The **ROOTS** are either tuberous, or spindle-shaped, and sometimes forked.

The **STEMS** are cylindric, full of pith, and frequently hollow. The branches are alternate.

The **LEAVES**, which, like the branches, are put on alternately, are very different in point of form, being simple and entire in some; target-shaped in a species of water navel-wort; finger or hand-shaped in some others; and pinnated or winged with numerous minute divisions, as in the greater number.

They are supported by a foot-stalk, which is very broad and membranous at its origin, and commonly embraces the whole contour of the stem and branches.

The **FLOWERS** are, in general, hermaphrodite. There
are,

are, however, some which have male or barren flowers in the same umbel.

This is particularly the case with those umbelliferous plants which have the petals in the flowers of the circumference large and unequal. Carrot, bastard-parfley, artedia, and coriander, furnish proper examples. In these plants, the flowers in the circumference only prove fertile, those in the centre or disk being abortive. The same appearance is conspicuous in some species of chervil and hog's-fennel. Water drop-wort and black master-wort, on the contrary, have the flowers in the circumference abortive. In ginseng, hermaphrodite and male flowers are produced upon distinct plants.

The flowers are disposed in an umbel, which is simple, as in water navel-wort; or compound, as in angelica, master-wort, carrot, hemlock, and many others. *Vide supra.*

The COMMON CALYX in this order is that sort termed very improperly by Linnæus, *involucrum*, or the flower-cover. This, in the greater number, consists of one or more leaves placed under the partial, or universal umbel, or both, for the purpose of support. The presence or absence of one or both of these covers affords excellent marks in discriminating the genera of this very similar order of plants. Carui, parfney, alexanders, fennel, herb-gerard, and burnet-saxifrage, want both the universal and the partial cover.

The PROPER FLOWER-CUP of each flower in the aggregate consists of five minute indentments placed upon the seed-bud, which it envelopes and accompanies to maturity.

The PETALS are five in number, and disposed upon the sides of the flower-cup in form of a rose. In the florets of the centre, the petals are generally pretty equal and small; in those of the circumference, they are frequently unequal and larger; in the greater number they are heart-shaped, and cut almost to the middle in two.

The STAMINA are five in number, placed opposite to the divisions of the flower-cup, and alternate with the petals.

The SEED-BUD is universally placed under the seat of the flower, and supports two styles that are turned backwards,
and

and crowned with simple summits, which do not differ in appearance from the styles.

The SEED-VESSEL in this order is wanting.

The SEEDS are two in number, which, when ripe, separate below, but remain closely attached at top.

The plants of this order which grow in dry places are sudorific, stomachic, and warming. Their virtue resides chiefly in the seeds and leaves. Those which grow in marshy places are generally poisonous. Of this kind are water-hemlock, water drop-wort, bastard stone-parsley, and creeping water-parsnep. The milky juice of the roots is caustic. Its qualities are blunted by acids, as the juice of citron or vinegar.

Notwithstanding the extremely warm and even caustic quality of most of these plants, many of them are employed in the œconomy of domestic affairs, particularly the roots of parsnep, carrot, and skirret; the leaves of parsley, celery, chervil; the seeds of fennel, anise, and coriander.

Of late years, an extract of the juice of the leaves of the greater hemlock, the *conium maculatum* of Linnæus, has been used successfully in schirrous disorders, and cancerous ulcers of the breasts. Dr. Storck of Vienna was the first who recommended it for this purpose. The external application is found efficacious in the same disorders.

UMBELLULA, a little umbel. Linnæus's name for each partial or particular umbel of an umbelliferous flower. *Vide* UMBELLÆ.

UMBO, (properly the boss of a buckler—a knob) a term of Morison, corresponding to the *discus* of Linnæus. *Vide* DISCUS.

UNGUIS—The claw, or lower part of each petal, in a flower consisting of more petals than one. *Vide* COROLLÆ. Likewise a term of measure. *Vide* MENSURA.



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EXPLANATION

OF THE

PLATES.

PLATE I.—LEAVES.

SIMPLE LEAVES. (*Vide FOLIUM.*) *

Fig.

1. *Folium orbiculatum*, a circular leaf, or that is perfectly round.
2. ——— *subrotundum*, a leaf approaching to a circular figure.
3. ——— *ovatum*, an egg-shaped leaf.
4. ——— *ovale*, a leaf having an oval or elliptical form.
5. ——— *oblongum*, an oblong leaf, in which the length greatly exceeds the breadth.
6. ——— *lanceolatum*, a lance-shaped leaf.
7. ——— *lineare*, a leaf of equal breadth throughout.
8. ——— *subulatum*, an awl-shaped leaf, which gradually tapers towards the top.
9. ——— *reniforme*, a leaf in figure resembling a kidney.
10. ——— *cordatum*, a heart-shaped leaf.
11. ——— *lunulatum*, a leaf resembling a crescent.
12. ——— *triangulare*, a three-angled leaf.
13. ——— *sagittatum*, a leaf which in form resembles the head of an arrow.
14. ——— *cordato-sagittatum*, a leaf which partakes of both shapes delineated in the tenth and thirteenth figures.
15. ——— *hastatum*, an halberd-shaped leaf.
16. ——— *fissum*, a leaf that is parted about halfway down, with straight margins.
17. ——— *trilobum*, a leaf divided to the middle into three parts, with convex margins; three-lobed.
18. ——— *premorsum*, a leaf so blunted at the apex as to give the appearance of being bitten off.

* Familiar examples of such of the terms respecting the figure and other circumstances of the leaves of plants as stand most in need of illustration, being given in the Dictionary, under the article *Folium*, to subjoin them in this place would be altogether unnecessary.

PLATE II.—LEAVES.

SIMPLE LEAVES *continued.*

Fig.

19. *Folium lobatum*, a leaf divided to the middle into several parts, with convex margins; a lobed leaf.
20. ——— *quinquangulare*, a five-angled leaf.
21. ——— *erosum*, an eroded leaf; a sinuated leaf, in which the margin is broken by smaller hollows, as if gnawed, or eaten away.
22. ——— *palmatum*, a palmate or hand-shaped leaf.
23. ——— *pinnatifidum*, a simple leaf resembling a pinnate or winged compound one.
24. ——— *laciniatum*, a leaf that is irregularly cut; a jagged leaf.
25. ——— *sinuatum*, a leaf that has hollows, or wide gaping breaks on the sides, (*sinus*, a bay).
26. ——— *dentato-sinuatum*, a leaf, the *sinuses* of which are indented.
27. ——— *retrorsum-sinuatum*, a leaf, the *sinuses* of which are turned backwards.
28. ——— *partitum*, a leaf deeply divided.
29. ——— *repandum*, a waved, scalloped, or serpentine-edged leaf.
30. ——— *dentatum*, an indented leaf.
31. ——— *ferratum*, (*serra*, a saw) a leaf having teeth resembling those of a saw, which point to the apex.
32. ——— *duplicato-ferratum*, a leaf that has a row of lesser ferratures placed upon the greater ones; twice-ferrated.
33. ——— *duplicato-crenatum*, a leaf in which there is a double row of the segments termed *crenæ* or notches, the lesser placed upon the greater; twice-notched. Vide Fig. 38.
34. ——— *cartilagineum*, a leaf having a cartilaginous or gristly edge.
35. ——— *acutè-crenatum*, a leaf acutely notched.
36. ——— *obtusè-crenatum*, a leaf obtusely notched.
37. ——— *plicatum*, a leaf plaited like a fan, or a candle-shade.
38. ——— *crenatum*, (*crena*, a notch) a leaf, the edges of which are cut into small segments, whether acute or obtuse, which point not to either extremity. Vide Fig. 33 and 36.—a notched leaf.



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P L A T E III.—LEAVES.

SIMPLE LEAVES *continued*.

Fig.

39. *Folium crispum*, a curled leaf.
40. ——— *obtusum*, a leaf which terminates obtusely.
41. ——— *acutum*, a leaf which terminates in an acute angle.
42. ——— *acuminatum*, a leaf whose apex is subulate or awl-shaped. (*Vide* fig. 8.)—an acuminate leaf.
43. ——— *obtusum acuminé*, a sharp pointed leaf, which does not begin to taper till very near the apex—obtuse with a point.
44. ——— *emarginatum aculé*, a leaf, the apex of which is deficient in its margin, and ends sharply.
45. ——— *cuneiforme emarginatum*, a leaf that is shaped like a wedge, and has a rounded notch or deficiency at the apex.
46. ——— *retusum*, a leaf which ends in an obtuse *sinus*.
47. ——— *pilosum*, a leaf, from the surface of which proceed long distinct hairs.
48. ——— *tomentosum*, a leaf whose surface is covered with a beautiful white down. *Vide tomentum*.
49. ——— *hispidum*, a leaf whose surface is covered with hard bristles.
50. ——— *ciliatum*, a leaf, the margin of which is fringed like an eye-lash, (*cilium*.)
51. ——— *rugosum*, (*rugæ*, a wrinkle) a wrinkled leaf.
52. ——— *venosum*, a leaf whose surface abounds with veins or branched vessels.
53. ——— *neruosum*, a leaf whose surface abounds with nerves, ribs, or simple unbranched prolongations of the pedicle.
54. ——— *papillosum*, a leaf, from the surface of which arise little bladders or blisters, (*papilla*, a nipple.)
55. ——— *linguiforme*, a tongue-shaped leaf.
56. ——— *acinaciforme*, a leaf shaped like a Persian scimitar, (*acinaces*.)
57. ——— *dolabriforme*, a leaf which in figure resembles a hatchet, (*dolabra*, a carpenter's ax.)
58. ——— *deltoides*, a leaf imagined to resemble the Greek delta, as in black poplar.
59. ——— *triquetrum*, a three-sided leaf, as in *amburicum ossifragum*.
60. ——— *canaliculatum*, (*canaliculus*, a little pipe, or channel) a channelled leaf; a leaf that has one longitudinal groove running from the base to the apex on the upper surface, the lower being convex.
61. ——— *fulcatum*, a furrowed or fluted leaf; a leaf that has several deep grooves or furrows, and in the same direction as the channelled leaf.
62. ——— *teres*, a cylindrical or pillar-shaped leaf.
63. ——— *panduræforme*, a leaf shaped like a violin, or Spanish guitar, as in *rumex pulcher*, (*pandura*, a musical instrument with three strings.)

PLATE IV.—LEAVES *continued*.

COMPOUND LEAVES.

- Fig.
1. *Folium binatum*, a fingered leaf with two leaflets.
 2. ——— *ternatum foliolis sessilibus*, a fingered leaf with three leaflets that are sessile*.
 3. ——— *ternatum foliolis petiolatis*, a fingered leaf having three stalked leaflets; the reverse of the preceding term.
 4. ——— *digitatum*, in general a fingered leaf; in the figure before us in particular, a leaf of that description with five sessile leaflets.
 5. ——— *pedatum*, a leaf somewhat resembling a bird's foot; exemplified in passion flower, and black hellebore.
 6. ——— *pinnatum cum impari*, a pinnate or winged leaf with an odd leaflet at the apex.
 7. ——— *abrupté pinnatum*, a pinnate leaf which at the apex has neither an odd leaflet nor tendril.
 8. ——— *pinnatum alternatim*, a pinnate leaf having the leaflets placed alternately along the mid-rib.
 9. ——— *pinnatum foliolis oppositis*, a pinnate leaf with opposite leaflets.
 10. ——— *interrupté pinnatum*, a pinnate leaf with unequal leaflets—interruptedly winged.
 11. ——— *pinnatum cirrosum*, a pinnate leaf terminated by a tendril.
 12. ——— † *pinnatum conjugatum*, a pinnate leaf with only two pair of leaflets.
 13. ——— *pinnatum decursivé*, a leaf decursively pinnate, that is, in which the leaflets run down or extend themselves into the stalk.
 14. ——— *pinnatum articulaté*, a pinnate leaf, in which the common footstalk connecting the leaflets is *articulate* or jointed.
 15. ——— ‡ *lyratum*, a lyre-shaped leaf.

* See fig. 12 and 14 in Plate VI.

† The reader must be careful to distinguish betwixt *folium binatum* and *folium conjugatum*; the first being the lowest modification of the digitate or fingered leaf, the second the lowest of the pinnate or winged one.

‡ This figure is improperly inserted in the present plate, its place being manifestly among the Simple Leaves.



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PLATE V.—LEAVES.

COMPOUND LEAVES *continued*.

Fig.

16. *Folium biternatum*, a re-compounded leaf that is doubly-ternate, that is, has the common footstalk divided into three parts, each of which has three leaflets.
17. ——— *triternatum*, a leaf that is triply-ternate, that is, has the common footstalk divided into three parts, each of which is doubly-ternate.
18. ——— *bipinnatum*, a doubly-pinnate leaf.
19. ——— *tripinnatum sine impari*, a triply-pinnate leaf, each pinna of which terminates abruptly.
20. ——— *tripinnatum cum impari*, a triply-pinnate leaf, with an odd leaflet at the apex of each pinna or wing.

* * For further illustrations on the subject of Compound Leaves, the reader is referred to the Section which bears that name in the Dictionary, under the article FOLIUM.

PLATE VI.—LEAVES *continued*.

DETERMINATION OR DISPOSITION OF LEAVES.

Fig.

1. *Folium inflexum*, a leaf bent inwards, or towards the stalk.
2. *erectum*, an erect leaf, or that is nearly perpendicular.
3. *patens*, a leaf bent outwards, or declining from the stalk at an acute angle; a spreading leaf.
4. *horizontale*, an horizontal leaf, which is placed at right angles with the stalk.
5. *reclinatum*, a leaf that is bent downwards.
6. *revolutum*, a leaf whose summits are rolled inwards.
7. *seminale*, a seed-leaf.
8. *caulinum*, a stem-leaf.
9. *rameum*, a branch-leaf.
10. *florule*, a leaf that is stationed near the flower.
11. *decurrens*, a decurrent or running leaf; a leaf which extends itself downwards along the stalk beyond its proper basis.
12. *petiolatum*, a leaf supported on a *petiolus* or footstalk.
13. *peltatum*, a target-shaped leaf.
14. *sessile*, a leaf that is seated immediately on the stem or branch, without any manifest footstalk; opposed to *petiolatum*.
15. *amplexicaule*, a leaf which transversely embraces the stem by its base.
16. *perfoliatum*, a perforated leaf. This leaf differs from the preceding chiefly in the perforation, which is likewise transverse, taking place at a greater distance from the margin.
17. *connatum*, a leaf formed by the union of two leaves at the base.
18. *vaginans*, a leaf the base of which longitudinally surrounds the stem like a sheath. By the circumstance of its longitudinal perforation, this species of leaf may be easily distinguished from those described at No. 15. and 16.





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PLATE VII.—LEAVES.

DETERMINATION OF LEAVES *continued*.

Fig.

19. *Folium articulatum*, a jointed leaf, a species of compound leaf, in which the leaflets are produced each from the summit of that immediately under it, as in *Cactus opuntia*. This singular appearance Berkenhout very properly compares to the links of a chain.
20. *Folia stellata*, leaves surrounding the stem in the form of a radiant star; synonymous to *verticillata*.
21. — *quaterna*, leaves growing by fours; a modification of the two former terms.
22. — *opposita*, leaves growing in pairs.
23. — *alterna*, leaves ranged singly in succession on both sides of the stalk; the reverse of the preceding term.
24. — *imbricata*, leaves laid over one another like tiles, (*imbrex*, a gutter tile) as in the genus *saxifraga*.
25. — *acersa*, chaffy leaves; leaves that are slender and of equal breadth throughout, somewhat hard, evergreen, pointed like pins, and surrounded at the base by chaffy scales. The term is exemplified in fir, pine, yew, and juniper.
26. — *fasciculata*, leaves which proceed in bundles (*fasciculi*) from the same point, as in the larch-tree, and some pines.
-
27. * *Frons*, a composition of a leaf and branch. The trunk of the palms and ferns is so termed by Linnæus. *Vide FRONS.*
28. *Folium spatulatum*, a leaf shaped like a spatula, as in *cistus incanus*, and *phlomis purpurea*.
29. — *parabolicum*, a leaf which, in figure, somewhat resembles the geometrical curve termed a parabola.

* *Frons* serves as a connecting link betwixt leaves and trunks, (the subject of the next plate). The two following terms belong to the division containing simple leaves.

PLATE VIII.

TRUNKS. (*Vide TRUNCUS.*)

Fig.

1. *Culmus squamosus*, a scaly culm, straw, or haulm; a species of that trunk or stem which is peculiar to the grasses. *Vide CULMUS.*
2. *Caulis repens* & *scandens*, a creeping and climbing stem, exemplified in *bignonia* and ivy.
3. *Scapus*, a species of trunk which elevates the fructification, but not the leaves; a naked flower-stalk, exemplified in *auricula*, and many of the liliaceous plants. *Vide SCAPUS.*
4. *Culmus articulatus*, a culm or straw that has knots or joints at certain intervals.
5. *Caulis volubilis*, a twining stem, exemplified in *convolvulus*, black bryony, and hop.
6. — *dichotomus*, (*διχα*, in two parts, and *τεμνω*, to cut) a forked stem; a compound stem, the divisions of which are always by pairs; as in *cerastium dichotomum*, and *valeriana locusta*.
7. — *brachiatus*, (*brachium*, the arm) a simple stem, whose branches grow by pairs, resembling arms; as in *mercurialis annua*.
8. *Stipes*, the trunk of a fungus. The term is likewise used for the *basis* or stalk of that peculiar species of trunk called a *frons*. See Plate VII. fig. 27.



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PLATE IX.

SUPPORTS AND ARMATURE OF PLANTS.

(*Vide* FULCRA.)

Fig.

1. *Stipula*, { a stipule ; a scale or scales at the insertion of the
footstalks of the leaves and flowers.
- Cirrus*, { a clasper or tendril.
2. *Aculeus simplex*, that species of vegetable armature called
prickles, (*aculei*) in which the weapons in question
proceed singly from the stem or branch. (*Vide*
ACULEUS.)
3. ——— *triplex*, prickles which grow by threes ; a three-
pronged prickle.
4. *Spina simplex*, a simple or single thorn. *Vide* SPINA.
5. ——— *triplex*, a triple thorn.
6. *Stimuli*, stings, as in the nettle, *acalypha* and *tragia*.
7. *Bractææ*, floral leaves ; leaves which differ in colour and shape
from the other leaves of the plant. In some
species of sage, lavender, and crown-imperial,
they assume the appearance of a tuft of hair at
the end of the flower-stem, and hence have ob-
tained the name of *coma*. *Vide* BRACTEA and
COMA.

PLATE X.

SUPPORTS AND ARMATURE OF PLANTS *continued*.

Fig.

8. *Glandulæ concavæ*, concave glandular appearances, seated on the footstalk of the leaves.
9. ——— *pedicellatæ*, glands placed on short footstalks, and which likewise have their seat on the *petiolus*.
 * Glands originally ranked by Linnæus among the *fulcra* of plants, were afterwards absorbed in the general term *pubes*. Wildenow, in his late edition of the *Philosophia Botanica*, has restored them to their former situation, with what propriety the reader is left to determine.
10. *Pili*, hairs; a species of pubescence. *Vide PUBES*.
11. A thorny leaf and branch.
12. The prickly capsule of the beech.
13. *Pedunculus*, a flower-stalk. This, in the *Delineatio plantæ*, and *Termini Botanici* of Elmgren, ranks with the *fulcra*, but is excluded, and with reason, in the *Philosophia Botanica*.
14. The thorny fruit of the horse-chefnut.
15. The prickly fruit of the chefnut,



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PLATE XI.

ROOTS. (*Vide RADIX and EULBUS.*)

Fig.

1. *Radix fusiformis*, a spindle-shaped root, as in carrot.
2. — *subrotunda*, a roundish root, as in turnip.
3. — *fibrosa*, a fibrous or stringy root, as in *senecio vulgaris*.
4. — *granulata*, a granulated root—a root consisting of a number of little knobs resembling grain, which are fastened to one another by small fibres or strings, as in *saxifraga granulata*.
5. — *præmorsa*, a root which ends abruptly, having the appearance as if bitten off. The term is exemplified in plantain, and *scabiosa succisa*.
6. — *tuberosa pendula*, a tuberous and pendulous root; as in *spiræa filipendula*, or drop-wort.

PLATE XII.

ROOTS *continued.*

Fig.

7. *Radix fascicularis*, a species of tuberous root, in which the knobby parts grow in bundles. This is sometimes termed a grumous root, and is exemplified in *rannunculus* and peony.
8. *Bulbus squamosus*, a scaly bulb, as in the white lily.
9. — *solidus*, a solid bulb, as in tulip.
10. — a transverse section of a solid bulb.
11. — *tunicatus*, a coated bulb, as in onion.
12. — a transverse section of a coated bulb.
13. The roots, or pates, as they are termed, of anemone.
14. *Radix testiculata*, a twin-root, as in orchis.
15. The root of bird's nest, a species of *ophrys*. This is evidently a modification of the fascicular or bundled root.



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PLATE XIII.

ROOTS *continued.*

Fig.

16. *Radix dentata*, a root whose knobs resemble teeth; a species of the granulated root, and exemplified in *primula*.
17. — *palmata*, a hand-shaped root, as in the genus *orchis*.
18. — *repens*, a creeping root; a root which extends in an horizontal direction, and sends forth radicles at certain intervals, as in the couch-grass.
19. Bulbs produced in the angle formed by the leaf and branch, as in *ranunculus ficaria*, or pilewort.
20. Roots sent forth from the midrib of the leaf, as in cuckow-flower, (*cardamine*.)
21. Roots produced from the joints of the stalk, as in *potentilla reptans*.

PLATE XIV.

PARTS OF FRUCTIFICATION.

(*Vide* FRUCTIFICATIO.)

a CALYX.

Fig.

1. *Perianthium*, the flower-cup properly so called.
2. *Amentum*, a catkin. *Vide* AMENTUM.
3. *Spatha*, a sheath; as in *narcissus*.
4. { *Calyx auctus*, an increased calyx; a perianth, which has a
5. { row of leaves distinct from the flower-cup surrounding
- the base, as in *dianthus*.
6. *Involucrum universale*, the universal *calyx* or cover of an umbelliferous flower, which is placed under the larger or general umbel. *Vide* INVOLUCRUM.
7. ——— *partiale*, the partial *calyx* or cover of an umbelliferous flower, which is placed under the smaller or partial umbel.
8. *Calyptra*, the calyx of the mosses.
9. *Volva*, the calyx of the *fungi*, or mushroom tribe.
10. *Gluma*, the husky *calyx* of the grasses.





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PLATE XV.

PARTS OF FRUCTIFICATION *continued.*

β COROLLA.

Fig.

1. *Corolla monopetala*, a corolla or flower of one petal.
2. ——— *hexapetala*, a corolla or flower of six petals.
3. ——— *polypetala serie duplici*, a corolla or flower of many petals, in a double series or row.

PLATE XVI.

PARTS OF FRUCTIFICATION.

COROLLA *continued*.

Fig.

4. *Corolla ringens*, a gaping or grinning flower; *a*, the upper lip, termed *galea* or helmet; *b*, the under lip.

5. *papilionacea*, a butterfly-shaped flower.

6. Exhibits the several parts of a papilionaceous flower:

a, representing the *vexillum*, or banner;

bb, the *alæ*, or wings;

c, the *carina*, or keel;

d, the *stamina*.

7. { *Corolla personata*, a masqued flower, or which resembles
8. { the snout of an animal;—*a*, the upper lip; *b*, the under lip.





by J. A. Edwards

Engraved by F. W. M.

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PLATE XVII.

PARTS OF FRUCTIFICATION.

COROLLA continued. (*Compound Flowers.*)

Fig.

9. *Corolla composita flosculis ligulatis*, a compound flower with flat, tongue, or strap-shaped florets; the semi-floscular flower of Tournefort.
10. *Flosculus ligulatus*, a flat or tongue-shaped hermaphrodite floret; the semi-floret of Tournefort.
11. *Corolla composita radiata*, a compound radiated flower, having semi-florets in the *radius* or circumference, and florets in the disk or centre.
12. The ligulated floret of a radiated flower, which wants both the sexual organs.
13. *Corolla composita flosculis tubulosis*, a compound flower with tubular or hollow florets; the floscular flower of Tournefort.
14. *Flosculus tubulosus*, a tubular or hollow floret; the floret properly so called.

* * For further particulars respecting compound flowers, the reader is referred to the articles *COMPOSITUS Flos* and *SYNGENESIA* in the Dictionary.

PLATE XVIII.

PARTS OF FRUCTIFICATION.

COROLLA *continued*.

Fig.

14. *Corolla campanulata*, a bell-shaped flower.

15. } Different modifications of the same.

16. }

17. *Corolla infundibuliformis*, a funnel-shaped flower.

18. ——— *hypocrateriformis*, a salver-shaped flower:

a, the limb, (*limbus*) or upper spreading part of the petal;

b, the tube, (*tubus*) or lower hollow part.

19. ——— *cruciformis*, a cross-shaped flower.

20. The petal of a cross-shaped flower, the upper spreading part of which, as of the petals of all polypetalous flowers, is termed *lamina*, the plate or border; the lower tapering part, *unguis*, or the claw.

21. *Corolla rotata*, the back or under side of a wheel-shaped flower.

22. The front or upper surface of a flower of the same description.





PLATE XIX.

PARTS OF FRUCTIFICATION *continued.*

γ NECTARIUM.

Fig.

1. The flower of aconite or monk's-hood.
2. The horned nectaries of the same, being two fistular, nodding bodies resembling stamina, with an oblique mouth and recurved tail, seated on long awl-shaped footstalks, and completely hid by the upper helmet-shaped petal.
3. A bell-shaped nectary, exemplified in *narcissus triandrus*.
4. The glandular nectary of willow (*salix*.)
5. *Nigella*, fennel flower, or devil-in-a-bush.
6. The eight lipped nectaries of the same.
7. *Tropaeolum*, or Indian cress, the nectary of which terminates the calyx, and resembles a cock's spur.

PLATE XX.

PARTS OF FRUCTIFICATION *continued*

♂ SEXUAL ORGANS.

Fig.

1. The *germen* or seed-bud of poppy, crowned with its flat, radiated, and target-shaped *stigma*.
2. Exhibits the different parts of a pistillum, viz. *stigma*, style and *germen*.
3. Another illustration of the same.
4. *Pistillum* of iris.
5. A *pistillum* with a three-cornered *stigma*, germen, and no style.
6. *Pistillum* of *Oenothera*, or tree-primrose :
 - a*, the quadrifid *stigma*.
 - b*, the style.
 - c*, the germen.
7. *Oenothera*:
 - a*, the *pistillum*.
 - b*, the *stamina*.
 - c*, the petals.
 - d*, the upper spreading part of the *calyx*.
 - e*, the tube, or long cylindrical lower part.
 - f*, the *germen*.
8. The parts of a stamen or male organ of fecundation, in which,
 - a* represents the *anther*,
 - b* the filament,
 - c* the pollen or fertilizing dust.

NECTARIUM *resumed*.

8. } Represent the singular nectaries of *parnassia*.
9. }
10. Passion-flower with its nectary, termed by Linnæus a triple crown.
11. The nectary of crown-imperial, being a *fovea* or pit in the base of each petal.
12. The five horned nectaries of columbine, as connected with the flower.
13. One of the horned nectaries of columbine detached from the flower.
14. The fringed or bearded nectarium in *iris*.



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PLATE XXI.

MODES OF FLOWERING. (*Vide INFLORESCENTIA.*)

Fig.

1. VERTICILLUS, a whirl or whorl.
2. FASCICULUS, a bundle or bunch.
3. SPICA, a mode of close inflorescence resembling a spike or ear of wheat, rye, or barley.
4. RACEMUS, a cluster; as of currants, grapes, &c.
5. PANICULA, a panicle; a mode of loose inflorescence resembling that of oats, and some other grasses.

PLATE XXII.

MODES OF FLOWERING *continued.*

Fig.

6. THYRSUS, a panicle contracted into an oval form.
7. { CYMA, a cyme ; a mode of inflorescence which differs from
8. { an umbel, in having the partial footstalks placed without any regular order.
9. CORYMBUS, a mode of flowering, which, like the preceding, resembles an umbel in its general appearance, but may easily be distinguished by the unequal length of the footstalks, which do not, as in the umbel, proceed from the same centre, but are produced from different parts on both sides of the stalk.
10. CAPITULUM, a little head.

* These terms, expressive of the various modes of flowering, with their different combinations, are fully explained in the Dictionary.





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Engraved by F. Sargent

PLATE XXIII.

PARTS OF FRUCTIFICATION *resumed.*

PERICARPIUM, or SEED-VESSEL.

Fig.

1. A Capsule, with an undivided cavity or single cell. *Vide CAPSULA and LOCULAMENTA.*
2. ————— with two cells.
3. ————— with three cells.
4. ————— with four cells.
5. ————— with six cells.
6. ————— with many cells.
7. That species of pod termed *legumen*, in which the seeds are fastened along one suture only. *Vide LEGUMEN.*
8. *Folliculus*, a species of dry seed-vessel, which opens longitudinally on one side from bottom to top, and has the seeds loose within it. *Vide Folliculus and Conceptaculum.*
9. Represents that pulpy kind of pericarpium termed *pomum*, with its inclosed capsule having five cells, in which are contained the seeds. *Vide POMUM.*
10. *Drupa*, a pulpy seed-vessel of the cherry kind, containing a nut or stone. *Vide DRUPA.*
11. The section of a *drupa*, exhibiting the pulpy part, and the stone.
12. A nut, or seed covered with a shell. *Vide NUX.*
13. *Strobilus*, a cone. *Vide Strobilus.*
14. *Bacca*, a pulpy pericarp without valves, inclosing naked seeds. *Vide BACCA.*
15. The transverse section of a *bacca*, to exhibit the disposition of the seeds within the pulp.
16. { That species of pod termed *siliqua*, in which the seeds are
17. { fastened to both sutures or joinings of the valves alternately. *Vide SILIQUA.*

PLATE XXIV.

THE CLASSES OR PRIMARY DIVISIONS OF THE
SEXUAL SYSTEM.

* The reader is referred to the Analysis or general Scheme of this celebrated Method prefixed to the present work, as likewise to the explanation of each class in the Dictionary, under its respective title.

Fig.

1. *Monandria.*
2. *Diandria.*
3. *Triandria.*
4. *Tetrandria.*
5. *Pentandria.*
6. *Hexandria.*
7. *Heptandria.*
8. *Octandria.*
9. *Enneandria.*
10. *Decandria.*
11. *Dodecandria.*
12. *Icosandria.*

Fig.

13. *Polyandria.*
14. *Didynamia.*
15. *Tetradynamia.*
16. *Monadelphia.*
17. *Diadelphia.*
18. *Polyadelphia.*
19. *Syngenesia.*
20. *Gynandria.*
21. *Monœcia.*
22. *Dicœcia.*
23. *Polygamia.*
24. *Cryptogamia.*





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PLATE XXV.

THE ORDERS OR SECONDARY DIVISIONS OF THE SEXUAL SYSTEM.

Fig.

1. The Order *monogynia*, containing hermaphrodite flowers with one *pistillum* or female organ.
2. *Digynia*, hermaphrodite flowers with two pistils;—*a*, the pistils detached from the flower.
3. *Trigynia*, hermaphrodite flowers with three pistils;—*a*, the pistils separated.
4. *Tetragynia*, hermaphrodite flowers with four pistils;—*a*, the pistils separated.
5. *Pentagynia*, hermaphrodite flowers with five pistils;—*a*, the pistils separated.
6. *Hexagynia*, hermaphrodite flowers with six pistils;—*a*, the pistils separated from the flower.
7. *Heptagynia*, hermaphrodite flowers with seven *pistilla*;—*a*, the *pistilla* detached from the flower.
8. *Decagynia*, hermaphrodite flowers with ten pistils;—*a*, the pistils separated.
9. *Dodecagynia*, hermaphrodite flowers with twelve female organs.
10. *Polygynia*, hermaphrodite flowers containing an indefinite number of *pistilla*, or female organs.

* Of these ten orders, *monogynia* is the first in the first thirteen classes; *digynia* the second in the same classes, the ninth excepted; *trigynia*, the third in all the classes just mentioned, except the first, fourth, and ninth, in which last it is present, but holds the second place. *Tetragynia* pertains to the fourth, fifth, sixth, eighth, and thirteenth classes; *pentagynia*, to the fifth, tenth, eleventh, twelfth, and thirteenth; *hexagynia*, to the ninth and thirteenth; *heptagynia*, to the seventh alone; *decagynia*, to the tenth; *dodecagynia*, to the eleventh, the single genus of which, however, (*sempervivum*) is generally ranked with the order *polygynia*, though this, from the indefinite and superior number of pistils, is much more properly restricted to the fifth, sixth, eleventh, twelfth, and thirteenth classes.

Fig.

11. *Gymnospermia*, the name of the first order in the class *didynamia*, in which *a* represents a longitudinal section of the flower, to display the four naked seeds in the bottom of the calyx.
12. *Angiospermia*, the name of the second order in the class *didynamia*, containing such hermaphrodite flowers with four stamina two longer than the others, as have their seeds contained in a vessel;—*a*, the pericarp, or vessel.
13. *Siliculosa*, the first order in the class *tetradynamia*, containing such flowers possessed of the classical character as have their seeds contained in a short round pod;—*a*, the *silicula*, or pod divided to shew the seeds.
14. *Siliquosa*, the second order in the class *tetradynamia*, containing such plants possessed of the classical character as have their seeds contained in a *siliqua* or long slender pod, to each future of which they are alternately attached;—*a*, the *siliqua*.
15. *Polygamia Æqualis*, the first order in the class *syngenesia*;—*a*, a floret separated from the aggregate.
16. ——— *superflua*, the second order in the class *syngenesia*; *a* represents a female floret in the circumference or ray; *b*, an hermaphrodite floret in the centre or disk.
17. ——— *frustranea*, the third order in the class *syngenesia*.
18. ——— *necessaria*, the fourth order in the class *syngenesia*.
19. ——— *segregata*, the fifth order in the class *syngenesia*.—*a*, a floret with its proper flower-cup detached from the aggregate.
20. *Monogamia*, the sixth order in the class *syngenesia*;—*a*, representing a section of the flower, to exhibit the union of the stamina by the anthers. *Vide syngenesia* in the Dictionary, where a full explanation is given of each of these orders.
21. { *Trinecia*, the third order in the class *polygamia*, in which
22. { hermaphrodite flowers are intermingled with male, or
23. { female flowers, or both, on one, two or three plants.
24. *Filices*, ferns, the first order,
25. *Musci*, mosses, the second order,
26. *Algæ*, sea-weed, flags, the third order,
27. *Fungi*, mushrooms, the fourth order,

} in the class
Cryptogamia.

I N D E X.

A.

- A**GGREGATE flowers. See *AGGREGATUS flos*.
Apple, a species of seed-vessel. See *POMUM*.
Arguments for the sex of plants. See *ANTHERA* and *SEXUS*.
Armature, or offensive weapons of plants. See *ARMA*, *ACULEUS*, *SPINA*.
Arm-pit of leaves and branches. See *AXILLA*.
Auxiliary parts of plants. See *FULCRA*.

B.

- Bark of plants. See *STRUCTURA vegetabilis*.
Beard of the grasses. See *ARISTA*.
Bell-shaped flower. See *COROLLA*.
Bell-shaped flowers, a tribe of plants. See *CAMPANACEÆ* and *CAMPANIFORMES*.
Berry, a species of seed-vessel. See *BACCA*.
Buds. See *GEMMA*.
Bulbs and bulbous roots. See *BULBUS*.
Bushy flower-leaves. See *BRACTEA* and *COMA*.
Butterfly-shaped flowers, a tribe of plants. See *PAPILIONACEÆ*.

C.

- Capsule, a species of seed-vessel. See *CAPSULA*.
Catkin. See *AMENTUM*.
Cells, or cavities of seed-vessels. See *LOCULAMENTA*.
Characteristical marks of plants. See *CHARACTERES*.
Chives. See *STAMEN* and *FILAMENTUM*.
Claspers. See *CIRRUS*.
Classes, natural and artificial. See *CLASSIS*.
Claw of the petal. See *COROLLA*.
Climate of plants. See *CLIMA*.
Clusters, modes of flowering. See *CORYMBUS* and *RACEMUS*.
Compound flowers. See *COMPOSITUS flos* and *SYNGENESIA*.
Cone, a species of seed-vessel. See *STROBILUS* and *CONUS*.
Cone-bearing plants. See *CONIFERÆ*.
Cross-shaped flower. See *COROLLA* and *CRUCIFORMIS flos*.
Crown of the seed. See *CORONULA*, *PAPPUS*, and *SEMEN*.
Deciduous

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D.

- Deciduous shrubs and trees. See DEFOLIATIO.
Direction of roots and trunks. See MOTUS.
Duration (terms of). See CADUCUS, DECIDUUS, and PER
SISTENS.
Dust, or powder of the *stamina*. See POLLEN.

E.

- Elasticity of the parts of plants. See MOTUS.
Emasculation of flowers. See CASTRATIO and SEXUS.
Empalement, or flower-cup. See CALYX.
Essence of the seed. See CORCULUM.
Evergreen shrubs and trees. See DEFOLIATIO.

F.

- Fall of the leaves. See DEFOLIATIO.
Female plant. See FEMINA *planta* and DIOECIA.
Female flower. See FEMINEUS *flos*, MONOECIA and DIOECIA.
Ferns, a tribe of plants. See FILICES.
Flags, or sea-weed, a tribe of plants. See ALGÆ.
The flower. See ANTHUS and FLOS.
Flowers growing in catkins. See AMENTACEUS *flos*.
Flowers growing in heads. See CAPITATUS *flos*.
Flower-cup. See CALYX and PERIANTHIUM.
Flower-leaf. See BRACTEA.
Foliation, or the wrapping up of the leaves in the buds. See
VERNATIO.
Foot-stalk of the flower and leaf. See PEDUNCULUS and PETIO-
LUS.
Full flowers. See PLENUS *flos*.
Funnel-shaped flower. See COROLLA.

G.

- Gaping, or grinning flower. See COROLLA.
Genera of plants, their distribution. See GENUS.
Generation of plants. See SEXUS.
Grasses, a tribe of plants. See GRAMINA.

H.

- Haulm of the Grasses. See CULMUS.
Head of flowers. See CAPITULUM.
Husbandry of fig and palm trees. See CAPRIFICATIO and
SEXUS.
Husk of the grasses. See GLUMA.

I.

- Irregular flower. See COROLLA.
Inoculation, or budding. See GEMMA.

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Keel of a pea-bloom flower. See CARINA and COROLLA.

L.

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Lobes of the feed. See COTYLEDONES.

Luxuriance in flowers. See LUXURIANS, MULTIPLICATUS, and PLENUS *flos*.

M.

Male plant. See MAS *planta* and DIOECIA.

Male flower. See MASCULUS *flos*, MONOECIA and DIOECIA.

Maturation of the fruit. See FRUCTESCENTIA.

Methods in botany, natural and artificial. See METHODUS.

Milkiness of plants. See LACTESCENTIA.

Modes of flowering. See INFLORESCENTIA.

Mosses, a tribe of plants. See MUSCI.

Motions of plants. See MOTUS.

Mushrooms, a tribe of plants. See FUNGI.

N.

Names of classes, genera, species, and varieties. See NOMINA.

Nutation of flowers. See MOTUS.

P.

Palms, a tribe of plants. See PALMÆ.

Parasitic plants. See RADIX.

Pea-bloom flower. See COROLLA and PAPILIONACEÆ.

PETALS. See COROLLA.

Pith of plants. See STRUCTURA *vegetabilis*.

Pod, a species of feed-vessel. See LEGUMEN and SILIQUA.

Poinal. See PISTILLUM.

Polygamy of plants. See POLYGAMIA.

Polygamy of flowers. See SYNGENESIA.

Prickles. See ACULEUS.

Principles of the sexual method. See ANIHERA.

Prolific flowers. See PROLIFER *flos*.

Pushing of the leaves. See FRONDESCENTIA.

R.

Rough-leaved plants. See ASPERIFOLIÆ and SCABRIDÆ.

Roots, their different forms. See RADIX and BULBUS.

S.

Salver-shaped flower. See COROLLA.

Scale for measuring the parts of plants. See MENSURA.

Seed-bud. See GERMEN.

Seed-

I N D E X.

Seed-covering (proper). See ARILLUS.
 Seed-leaves. See COTYLEDONES.
 Seed-vessels. See ANGIOSPERMÆ *herbæ* and PERICARPIMUM.
 Sleep of plants. See MOTUS.
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 Spur of flowers. See CALCAR and NECTARIUM.
 Stem or stalk. See CAULIS and CULMUS.
 Stem-bulbs. See BULBUS.
 Stock, or body of the root. See CAUDEX and RADIX.
 Suckers. See BULBUS.

T.

Taste, an attribute of plants. See SAPOR.
 Tendrils. See CIRRUS.
 Threads of the stamina. See FILAMENTUM.
 Time of flowering. See EFFLORESCENTIA.
 Tops of the stamina. See ANTHERA.
 Trees distinguished from shrubs and herbs. See ARBOR.
 Tube of the flower. See COROLLA.
 Twisting of the parts of plants. See INTORSIO.

V.

Veil, or flower-cup of the mosses. See CALYPTRA.

W.

Wheel-shaped flower. See COROLLA.
 Winged seeds. See ALA and SEMEN.
 Wings of a pea-bloom flower. See ALÆ, COROLLA and PAPILIONACEÆ.
 Wintering of vegetables. See HYBERNACULUM, BULBUS, and GEMMA.

*Alphabetical List of the more remarkable Plants
described or particularly mentioned in the Course
of the foregoing Work, with a Reference to the
Natural Order under which each is arranged.*

A.

- ACACIA. See *Lomentaceæ*.
 Adder's tongue. See *Filices*.
 Agaric. See *Fungi*.
 Ahouai. See *Contortæ*.
 Aloe. }
 American aloe. } See *Coronariæ*.
 American ebony. See *Papilionaceæ*.
 American night-shade. See *Miscellaneæ*.
 American viburnum. See *Personatæ*.
Apocynum androsæmifolium et cannabinum. See *Contortæ*.
 Arabian jessamine. See *Sepiariæ*.
 Areca, or faufel-nut. See *Palmae*.
Aristolochia anguicida. See *Sarmentaceæ*.
 Arnotta, or roucou. See *Columniferae*.
 Arum. See *Piperitæ*.
Asclepias Syriaca. See *Contortæ*.
 Avignon berries. See *Dumosæ*.
 Avocado, or avigato pear-tree. See *Holeraceæ*.
Azalea pontica. See *Contortæ*.
 ——— *viscosa*. See *Bicornes*.

B.

- Bamboo-cane. See *Gramina*.
 Banana-tree. See *Scitamineæ*.
 Baobab, or Æthiopian four-gourd. See *Columniferae*.
 Barbadoes aloe. See *Coronariæ*.
 Barbadoes cedar. See *Miscellaneæ*.
 Barren pine-apple. See *Coronariæ*.
 Barbadoes flower-fence. See *Lomentaceæ*.
 Bastard cypress. See *Calamariæ*.
 Bastard rhamnus. See *Calycifloræ*.
 Bastard ipecacuanha. See *Contortæ*.
 Bastard sensitive-plant. See *Papilionaceæ*.
 Bee-flower. See *Orchideæ*.
 Beet, and fugar-plants. See *Holeraceæ*.
Beidelfar, (an African species of swallow-wort), See *Contortæ*.
 Benjamin-tree. See *Holeraceæ*.

Bermudas

ALPHABETICAL LIST

Bermudas cedar. See *Coniferae*.
 Betel. See *Piperitae*.
 Bladder-carex. See *Calamariæ*.
 Bondue. See *Lomentaceæ*.
 Bottle-gourd. See *Cucurbitaceæ*.
 Brafiletto. See *Lomentaceæ*.
 Buck-thorn. See *Dumofæ*.
 Bull-rush *Scirpus*. See *Calamariæ*.

C.

Cabbage-tree. See *Palmae*.
 Calabash. See *Putamineæ*.
 Caltrops. See *Gruinales*.
 Camphire-tree. See *Holeraceæ*.
 Canadian pines. See *Coniferae*.
 Caper-bush. See *Putamineæ*.
 Carolina red-bay. } See *Holeraceæ*.
 Cashew-nut. }
 Cassia fistula. See *Lomentaceæ*.
 Cassine. See *Dumofæ*.
 Cedar of Lebanon. See *Coniferae*.
Cerastium viscosum. See *Caryophyllei*.
Cerbera manghas. See *Contortæ*.
 Ceterach. See *Filices*.
 China rose. See *Columniferæ*.
 Cinnamon-tree. See *Holeraceæ*.
 Clove. See *Hesperideæ*.
 Cochineal shrub. See *Succulentæ*.
 Cocoa-nut tree. See *Palmae*.
Collinsonia. See *Personatæ*.
 Colocasia. See *Pipritæ*.
 Coloquintida. See *Cucurbitaceæ*.
 Contrayerva. See *Scabridæ*.
 Cotton-grafs. See *Calamariæ*.
 Cotton-shrub. See *Columniferæ*.
 Cow-itch vine. See *Papilionaceæ*.
 Cucubalus behen. }
 ————latifolius. } See *Caryophyllei*.
 ————otites. }

Custard-apple. See *Coadunatæ*.
 Cyprefs. See *Coniferae*.
 Cyprefs-grafs. See *Calamariæ*.

D.

Dacha. See *Scabridæ*.
 Date tree. See *Palmae* and *Sexus*.
 Dog's-tooth violet. See *Sarmentaceæ*.
 Dogwood-tree. See *Papilionaceæ*.
Dolichos urens. See *Papilionaceæ*.

Dragon-

Dragon-tree. See *Palmae*.
 Dyer's-broom. See *Papilionaceæ*.
 Dyer's-weed, or weld. See *Miscellaneæ*.

E.

Egyptian dog's-bane. See *Contortæ*.
 ——— melon. See *Cucurbitaceæ*.
 ——— Thorn. See *Dumofæ*.
 Elaterium. See *Cucurbitaceæ*.
 Elder (common). } See *Dumofæ*.
 — (dwarf). }
 Elm leaved sumach. See *Dumofæ*.

F.

Farobier. See *Papilionaceæ*.
 Florentine orrice. See *Ensatae*.
 Fragrant rush. See *Calamariæ*.
 Fraxinella. See *Multifiliquæ*.
 Freezing-wyth. See *Sarmentaceæ*.

G.

Garlick-pear tree. See *Putamineæ*.
 Gentian. See *Rotaceæ*.
 Geranium. See *Gruinales*.
 Ginseng. See *Hederaceæ*.
 Goat's-Thorn. See *Papilionaceæ*.
 Greek valerian. See *Campanaceæ*.
 Guava. See *Hesperideæ*.
 Guaiacum. See *Gruinales*.
 Guinea aloe. See *Coronariæ*.
 ——— Corn. See *Gramina*.
 ——— Pepper. See *Luridae*.
 Gum Arabic. See *Lomentaceæ*.
 ——— Copal. See *Dumofæ*.
 ——— Senegal. See *Lomentaceæ*.
Gypsophila fastigiata. See *Caryophyllei*.

H.

Hellebore. See *Multifiliquæ*.
 Hemp. See *Scabridæ*.
Hibiscus (different species of.) See *Columniferæ*.
 Herb-christopher. See *Multifiliquæ*.
 Holly. See *Dumofæ*.
 Hop. See *Scabridæ*.
 Horizontal-cypress. See *Coniferae*.
 Horse-Cassia. See *Lomentaceæ*.
 Hypericum (species of), See *Rotaceæ*.

ALPHABETICAL LIST

I.

- Jalap. See *Campanaceae*.
 Japanese Citron. See *Bicornes*.
 Jew's mallow. See *Columniferae*.
 Indian arrow-root. See *Scitamineae*.
 ——— lychnis. See *Caryophyllei*.
 ——— mallow. See *Columniferae*.
 Indigo. See *Papilionaceae*.
 Iron-wood. See *Dumofae*.
 Judas-tree. See *Lomentaceae*.
 Jujube. See *Dumofae*.
 Juniper. See *Coniferae*.

L.

- Labdanum. See *Rotaceae*.
 Laburnum. See *Papilionaceae*.
 Larch-tree. See *Coniferae*.
 Lily (white). } See *Coronariæ*.
 ——— (Martagon). }
 Lime or Linden-tree. See *Columniferae*.
 Liquorice. See *Papilionaceae*.
 Logwood. See *Lomentaceae*.
 Lycopodium. See *Musci*.

M.

- Magnolia. See *Coadunatæ*.
 Mahogany. See *Miscellaneæ*.
 Maiden-hair (different species of). See *Filices*.
 Malabar night-shade. See *Holeraceae*.
 ——— oleander. See *Contortæ*.
 Male balsam-apple. See *Cucurbitaceae*.
 Manchincel-tree. See *Tricoccae*.
 Mangroves, or mangles. See *Holeraceae*.
 Manioc, manihot or cassava. See *Tricoccae*.
 Marsh-mallow (common). See *Columniferae*.
Melastoma (East-Indian species of). See *Calycanthemæ*.
Melianthus, or honey-flowers. See *Corydales*.
 Mitre-shaped aloe. See *Coronariæ*.
 Monkshoods. See *Multifiliquæ*.
 Montpellier-scammony. See *Contortæ*.
 Moon-seed. See *Sarmentaceæ*.
 Mountain-bistort. See *Holeraceæ*.
 Musk-melon. See *Cucurbitaceæ*.
 Myrtle. See *Hesperideæ*.
 Myrtle-leaved fumach. See *Miscellaneæ*.

Nettle-

OF PLANTS.

N.

Nettle-tree. See *Scabridae*.
New-Jersey tea. See *Dumosae*.

O.

Okra. See *Columniferae*.
Oleander, or rose-bay. See *Contortae*.
Oleaster, or wild olive of Bohemia. See *Calycifloræ*.
Orchis. See *Orchideæ*.
Opuntias, or Indian figs. See *Succulentæ*.

P.

Palmetto, or thatch. } See *Palmae*.
Palm-oil tree. }
Pearl-aloe. } See *Coronariæ*.
Penguin, or karatas. }
Pepper of Senegal. See *Piperitæ*.
Persian manna. } See *Papilionaceæ*.
Pigeon-pea. }
Pimento, or all-spice. See *Hesperidææ*.
Pine (cultivated). See *Coniferae*.
Pine-apple. See *Coronariæ*.
Pineaster. } See *Coniferae*.
Pitch-tree. }
Poet's ivy. See *Hederaceæ*.
Poison-ash. } See *Dumosae*.
Poison-tree. }
Polypody. See *Filices*.
Popo-tree. See *Tricoccæ*.
Prickly anonis. See *Papilionaceæ*.
Pumpkin. See *Cucurbitaceæ*.

R.

Red jasmine. See *Contortae*.
Reeds. See *Gramina*.
Rhamnus alaternus. } See *Dumosæ*.
——— *frangula*. }
Rhubarb. See *Holeraceæ*.
Rice. See *Gramina*.
Ricinus, or palma-christi. See *Tricoccæ*.
Royal Osmund. See *Filices*.

S.

Saffron. See *Ensatae*.
Sago-tree. See *Palmae*.
Sapota. See *Dumosae*.

ALPHABETICAL LIST

- Sassafras-tree. See *Holeraceæ*.
 Scammony. See *Campanaceæ*.
 Scorpion-fenna. See *Papilionaceæ*.
 Screw-tree. See *Columniferae*.
 Sea bind-weed. See *Campanaceæ*.
 Senna.
 Senega rattle-snake root. } See *Lomentaceæ*.
 Sensitive plant. }
 Shrubby medick. See *Papilionaceæ*.
 Silk cotton-tree. See *Columniferae*.
 Soap-wort (officinal). See *Caryophylli*.
Solanum (species of). See *Luridæ*.
 Sour-fop. See *Coadunatæ*.
 South-sea tea. See *Dumosæ*.
 Spanish potatoe. See *Campanaceæ*.
 Spindle-tree. See *Dumosæ*.
 Spruce fir of North America. See *Coniferae*.
 Spurious varnish-tree. See *Dumosæ*.
 Squash. See *Cucurbitaceæ*.
 Squills. See *Coronariae*.
 Staff-tree. }
 Star-apple. } See *Dumosæ*.
 Storax-tree. See *Bicornes*.
 Succotrine aloes. See *Coronariae*.
 Sugar-cane. See *Gramina*.
 Swallow-wort (common). See *Contortæ*.
 Sweet-rush. See *Piperitæ*.
 Syrian dog's-bane. See *Contortæ*.

T.

- Tea-shrub. See *Columniferae*.
 Thapsia. See *Campanaceæ*.
 Tooth-ach tree. See *Hederaceæ*.
 Traveller's joy. See *Multifiliqæ*.
 Tree-vervain-mallow of Java. See *Columniferae*.
 Tulip-tree. See *Coadunatæ*.
 Turbeth, or turbith. See *Campanaceæ*.

V.

- Vanelloes. See *Orchideæ*.
 Varnish-tree. See *Dumosæ*.
 Venice-fumach. See *Dumosæ*.
 Venus's fly-trap. See *Lomentaceæ*.
 Vetch (bitter). See *Papilionaceæ*.
 Vinegar-tree. }
 Virginian fumach. } See *Dumosæ*.

OF PLANTS.

W.

- Warted-gourd. See *Cucurbitaceæ*.
Water-melons, or citruls. See *Cucurbitaceæ*.
Water-foldier. See *Palmæ*.
White bryony. See *Cucurbitaceæ*.
White hellebore. See *Coronariæ*.
White mullein. See *Luridæ*.

Y.

- Yams. See *Sarmentaceæ*.

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